Government Assistance and Total Factor Productivity: Firm-level Evidence from China, 1998-2007

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Abstract
The provision of large-scale assistance to industry is very important in China. The major contribution of this paper is to use Chinese firm-level panel data for 1998-2007 to introduce measures of assistance received by each firm directly into industry-level production functions determining firm output. Our results indicate inverted U-shaped gains from assistance: across the 26 industries considered, firms receiving assistance rates of 1-10%, 10-19%, 20-49% and 50+% experienced on average 4.5%, 9.4%, 9.2% and –3% gains in TFP, respectively. We also provide a simple agency model that justifies such a result.

Keywords: Subsidies; TFP; China; firm-level

JEL codes: D24; O14; O43

1. Introduction

Providing assistance to industry as part of an industrial strategy has a long history, in both developing and developed economies (Schwartz and Clements, 1999). Until more recently, such approaches were presumed to have been largely a failure, summed-up by Cohen (2006, p. 88) as follows:

> "The standard criticism levelled against sectoral industrial policies is that the state has neither the necessary information nor adequate incentives to make better choices than the market… it tends to misestimate … the negative long-term effects of the protection granted to certain firms and the negative impacts of the benefits granted to promoted sectors on other sectors."

However, industrial policy is generally now regarded more favourably as shown by various contributions to recent books on the topic (e.g., Felipe, 2015; Stiglitz and Lin, 2013). Rather than just 'believe' in the market and allow economic success to be generated by globalisation allied to government intervention in support of liberalisation, privatisation and deregulation, "… it has become obvious that all governments are engaged in various forms of industrial policies… (therefore) the question is not *whether* any government should use industrial policy but rather *how* to use industrial policy in the best way" (Stiglitz et. al. 2013, pp. 5-6).

China is perceived as a country that provides large-scale assistance to industry (Haley and Haley, 2013). But was government assistance targeted at the right firms and sectors? A recent paper by Aghion et. al. (2015) investigated if the distribution of government assistance to firms in China enhanced productivity, finding that assistance was allocated to competitive sectors and /or fostered competition in a sector[1] so enhancing productivity growth over the 1998-2007 period. Their approach was essentially to test if subsidies were correlated with initial competition levels, where the latter was measured using a Lerner index. They also measured the concentration of assistance across firms within each sector (using a Herfindahl index). Both the correlations obtained at the sector-city level

[1] Competition-friendly policies are defined as those that allocate assistance to a wide group of firms in a sector (so encouraging competition) and/or that target younger and more productive firms.

(the Lerner indices) and the Herfindahl indices were regressed on firm-level total factor productivity (TFP) estimates obtained using an Olley-Pakes approach. Both measures were found to have positive and significant impacts on TFP, and this is taken as evidence that government assistance was targeted at the right firms and sectors.

However, Aghion et. al. (op. cit.) did not test directly whether receiving assistance had a direct impact on each firms' TFP; if receiving assistance is found to lower firm-level TFP (at least for some categories of firms or at, say, high levels of assistance) then it may well be that overall industrial policy in China introduces distortions that increase misallocation and work against the productivity-enhancing effects associated with the (more macro-level) distribution of assistance. Whether assistance acts as a boost to investment and production, while at the same time underpinning productivity growth, is largely an empirical issue. Thus the major contribution of this paper is to fill this gap in the literature, by introducing variables that measure the assistance (e.g., tax 'holidays') received by each firm directly into production functions determining firm output. A system-GMM econometric approach is used to measure firm-level productivity (with the variables representing assistance instrumented by their lagged values). To check the robustness of our results, the impact of assistance is also tested using a production function approach based on 'matching' firms receiving assistance with those not receiving 'treatment' who nonetheless had very similar characteristics to the assisted sub-group. Both sets of results indicate that across the 26 industries considered Chinese firms that received assistance had higher TFP during 1998-2007, although there is some evidence that too high a level of assistance has negative consequences for TFP, suggesting that 'rent-seeking' and/or the pursuit of profit is blunted when firms become too dependent on government help, especially when such help is tied to 'political control' by the state (which is the case in China as explained below). To justify such results, we provide a simple model in the appendix that sets out how this is consistent with economic theory.

Apart from the Aghion et. al. (2015) study, we are only aware of a study by Girma et. al. (2009) who used the same database as we use (but only for 1999 to 2005) to consider whether subsidies

boosted export sales for domestic firms in manufacturing (finding subsidies stimulated exporting intensities of existing exporters but had little impact on encouraging firms to enter exporting). The major differences with the current study are: we include all (and not just domestic) firms in manufacturing and utilities covering 1998-2007; the more important form of assistance provided through 'tax holidays' (as well as subsidies) is included; and our dependent variable is TFP. Other studies, mostly covering developed economies, that consider the impact of assistance on productivity are relatively scarce, usually relate only to labour productivity (not TFP) and have produced mixed results. For example, Irwin and Klenow (1996) found no impact on labour productivity of R&D subsidies for U.S. high-tech companies; for Japanese forestry, Managi (2010) found a negative relationship between subsidies and TFP; Einio (2014) reports no instantaneous impacts of R&D support programmes in Finland on productivity (although there is evidence of long-term gains); Huang (2015) shows that tax credit use among Taiwanese firms enhanced their productivity; while Koski and Pajarinen (2015) report that R&D subsidies had no statistically significant impact on labour productivity in Finnish firms during 2003-2010, although employment subsidies and other subsidies (the latter covering similar State aid instruments as included in the present study) were negatively related to output-per-worker.[2]

The paper is set out as follows. In the next section we discuss the rationale for the (Chinese) government providing assistance to firms, where government aid can be central, state or local (or some combination of all three levels). In Section 3 we discuss briefly the form that assistance takes and present some background information on its importance to firms. Following this, we estimate a Heckman model determining which firms received assistance, and for those where assistance was positive how much help was provided. Then the results from estimating industry-level production functions using system-GMM and a 'matching' approach are presented. The paper concludes with a summary and some ideas for further research that would extend the approach taken in this paper.

[2] Karhunen and Huovari (2015), using similar data, confirm these results for Finland.

2. The rationale for government assistance to firms

The starting (traditional neoclassical) position is usually that markets are efficient such that they are the best mechanism by which to allocate resources (cf. the model of general equilibrium associated with Arrow and Debreu, 1954); the exception is when there are market failures (European Commission, 2002). Traditionally such failures have been associated with imperfect and asymmetric information being available to (especially smaller) firms, and/or imperfect (risk) markets leading to higher (financial) costs for by such firms and more generally a problem of incomplete markets (Greenwald and Stiglitz, 1986). Failures are also associated with not being able to capture positive externalities in other firms – such as R&D spillovers – or the wider benefits gained from geographic agglomeration (e.g., intra-industry specialization through Marshall-Arrow-Romer economies and/or inter-industry Jacobian urbanization economies[3]).[4]

More recently, there has been an emphasis on dynamic factors that lead to a comparative advantage (Rodrik, 2006), such as the importance of knowledge and firm capabilities as a source of firm performance and thus productivity growth.[5] Thus government intervention to enhance both learning and learning spillovers is especially warranted to coordinate structural transformations that will close the "knowledge" gap that exists with firms at the (international) frontier, so moving resources from low- to high-productivity sectors (it is argued – see Felipe, 2015 – that such sectors

[3] See Marshall (1890), Arrow (1962), and Romer (1986) and Jacobs (1970, 1986)

[4] Such justification for government intervention on the grounds of market failure has been criticized by those who do not adhere to the neoclassical tradition; for example, evolutionary economists (e.g., Metcalfe and Georgiou, 1998) have argued that information costs, leading to asymmetric outcomes, are one of the features of the market, and they are in part necessary as a selection device (for promoting the fittest firms) and in providing incentives for learning and discovery, which is crucial to the process of variety creation upon which the evolutionary view of markets is based (as Metcalfe and Georgiou, *op. cit*., point out "a profit opportunity known to everybody is a profit opportunity for nobody"). This does not mean that there is no rationale for government intervention, assuming that it sees a direct increase in economic benefits from more firms gaining information and thus acting on that information (e.g., by adopting certain technologies, increasing their overall capabilities, etc.). For example, Casson (1999) argues that in this situation the government has a comparative advantage in information, and it is on this basis (not market failure) that it can justify intervention. See also Cohen (2006, section 3.1).

[5] Note, this is not limited to 'catch-up' in developing economies; 'network failures' in general arise because technological know-how (broadly defined) is partly tacit and therefore cannot be diffused easily. Networks can be important for the transfer of such tacit knowledge (they are mutual learning processes fostered by well-managed collaboration between specialists in complementary fields, as well as between designers, producers and end-users) , and they can also partly overcome the problems associated with firms experiencing bounded rationality and consequently bounded vision (Teece and Pisano, 1998).

do not develop naturally in developing economies without government help). Thus, for example, Khan (2015) sets out a model of the 'competitiveness curve' that justifies assistance to industry (particularly in developing economies) based on providing 'rents for learning' to cover knowledge and capability gaps and encourage learning-by-doing. In developing economies like China, firms initially lack the sophisticated organisations and technical capabilities to produce goods and services at global quality standards (and costs), and assistance buys time to engage in the learning that is needed, as well as encouraging inward foreign direct investment from firms that have the required competencies (which should also lead to additional spillover effects).

In China, there is an additional rationale for government providing (large-scale) assistance to firms; in principle all firms in China are subject to political control – i.e., there is a *lishu*[6] relationship, which means firms are "subordinate to" political influence. In practice the *lishu* relationship includes "… approvals for licences, domain, major projects, major operations decisions (such as profit distribution and investment) and firm structures" (Tan et. al., 2007, p. 788), all of which are set to meet political objectives. As well as controls, the *lishu* relationship also involves government support and subsidies (e.g., access to finance, more favourable tax treatment, granting of contracts, access to raw materials and other 'scarce resources'[7], etc.). The relationship is much stronger for publicly owned firms (e.g., state-owned enterprises, or SOEs, and collectively owned enterprises), who are also expected to meet certain 'social' goals set by politicians, such as employment targets, but it is still relevant to privately-owned and foreign-owned firms (either because of the strength of political connections and/or because of intervention by government).[8] However, Xia et. al. (2009) state that over time the importance of *lishu* has diminished especially following reforms introduced in 1997, and the vast majority of newly established privately owned firms that have set up in China since the

[6] The Chinese name for this relationship, as represented in the National Bureau of Statistics database we use below, is 隶属关系.

[7] Closer ties to government can also help businesses to overcome market and state failures in securing property rights and enforcing contracts – Li et. al., (2008) and Zhou (2013). Note, therefore, this definition of politically connected firms is different to the approach adopted by Faccio (2006), who looked at such connections across 47 countries (excluding China).

[8] An essential difference in the *lishu* relationship between publicly-controlled and privately-owned firms tends to be that the former are more beset with meeting policy goals (e.g., employment) rather than receiving favourable treatment such as subsidies and/or access to finance (Wu et. al., 2012).

late 1990s have opted not to have any (formal) *lishu* relationship with the government (central, regional or local). Evidence for this is provided in Ding et. al. (2015, Table 1), who show that the proportion of medium- to large-sized Chinese firms in manufacturing and utilities with no political connections increased from 15.7% in 1998 to 76% by 2007. And yet the same data (which is also used in this study – see Table 1 below) shows that on average between 1998-2007 nearly 57% of firms receiving assistance had no formal political connections (nearly 52% of all firms, which includes those with no assistance, had no political connections). This provides strong support for the claim made by Haley and Haley (2013, Chapter 1) that under the operation of Chinese State Capitalism, the government is able to meet its industrial strategies not so much directly through traditional *lishu* relationships but rather through ensuring firms are dependent on government for financial assistance that creates mutual dependence.[9] Because of the decentralisation of power in China to the provinces, and the further layer of often strong local government with its own agenda, firms can have different (even several) links with central, provincial and local governments, each with hidden and often conflicting budgetary processes. Li and Zhou (2005) point out that local government officials have a major incentive to develop the economies in their jurisdictions because their political careers depend on the economic performance of their regions. Thus Walder (1992, pp. 528-29) comments that "China's national budget is a nested hierarchy of independent budgets – each government unit exercises property rights over firms under their financial jurisdiction… each of which seeks to expand its revenues by capturing investment, subsidies, and grants". Haley and Haley (op. cit. p. 21) review the case study evidence that shows "provincial governments deploy massive subsidies to support favoured business groups and further provincial rather than central objectives or efficiencies".

[9] Haley and Haely (op. cit, p.21-22) note that "in China political factors matter at least as much as, and often more than, economic factors for firms' and markets' performance and therefore for the dispensation of subsidies". They also argue – based on case studies – that there is substantial evidence that Chinese production subsidies have encouraged many overseas (and especially U.S.) firms to move manufacturing to China, after developing their technological competencies in their home countries.

Thus while Chinese policymakers in the period after the 'open door' reforms starting in 1992 sought to learn from how Korea and Japan achieved large-scale development, which included lessons in subsidising strategic industries, there is evidence (Heilmann and Shih, 2013) that full-scale assistance to firms (and industrial policy more generally) only really got going in the 1990's once Chinese policymakers had concluded that by supporting targeted firms they could advance the state's interests in the new economic order (Thun, 2004). Historically, such help had been limited to State-owned Enterprises (SOEs), but since the 1990's this has been extended to privately-owned firms as well.

In terms of the type of assistance usually given to firms, this tends to be based on 'horizontal' (covering activities that take place in a broad range of sectors and typically affecting the 'infrastructure' surrounding firms) and 'vertical' (more targeted on specific firms and sectors) policies. The former has in more recent times received greater support as it is seen to have a smaller impact on competition (since it is not about 'picking winners' as all firms should face a 'level playing field'), whereas vertical policies can favour one (sub-group) of firms to the detriment of others. That said, even horizontal policies impact more on certain firms (e.g., those more engaged in R&D, or located in sectors with attributes that are being encouraged by policy, such as higher value-added). In the Chinese context, Lin et. al. (2015) argue there has been a continuous upgrading towards more capital-intensive sectors with (latent) dynamic comparative advantage (rather than the static advantage of having a substantial, relatively cheap abundance of sufficiently skilled labour). In broad terms, industrial policy pursues the growth of 'pillars' (key industries[10]) where technology acquisition and improving competitive advantage feature strongly. Firms receive various financial incentives (including 'tax holidays', grants, and access to cheap loans), that are consistent with providing additional liquidity and sharing risk, and thus overall subsidizing production and investment; however, as Haley and Haley (2013, pp. 31-32) point out official information is very limited on how

[10] There are currently around 15 'pillar' industries set by the central government in China, from technology-intensive sectors like aerospace and computing, through to wholesale and retailing. The 'culture' sector is also now a pillar industry.

much assistance is provided, to whom and for what. Thus they conclude that "generally, despite stated policies, outsiders cannot ascertain the true policies that underlie subsidies".

Thus whether assistance acts as a boost to investment and production, while at the same time underpinning productivity growth, is largely an empirical issue. Does it mitigate market failures, help infant industries, new firm entry and underdeveloped capital markets, coordinate (vertical and horizontal) linkages in production and enhance learning-by-doing; or, as Porter (1990) argues, do subsidies dull the market incentives firms' face, delay adjustment and innovativeness, and overall constrain flexibility and instead create a culture of 'rent seeking' (particularly for SOEs and those firms with strong political connections with government – cf. Yu et. al., 2010; Tan et. al., 2007)?

Based on the discussion in this section, and in anticipation of the results presented below, we provide a simple theoretical model in the appendix where generally assistance lowers the 'user' cost of capital, so relaxing likely financial constraints and allowing firms to upgrade their capital stock (e.g., through lowering costs as 'vintage' capital stock is replaced by more efficient, newer capital equipment) and inducing managerial effort to introduce new and higher quality products, which in turn will lead to decreases in marginal cost and boost profitability. This consequently increases measured revenue TFP. However, a high rate of assistance also leads to more managerial effort to be endogenously divided into rent-seeking (e.g., through *lishu* relationships) rather than pursuing higher levels of TFP (thus higher profit), where the former (cet. par.) boosts the personal reward to managers rather than profitability (e.g., when corruption is present, it may be possible for them to use the extra profits to reward themselves more directly – see, for example, Hanke and Heine, 2015). The outcome is that we are able to show that up to a certain assistance rate the effect of managerial effort endogenously devoted into profitability improvement (and thus TFP) dominates the effect of managerial effort allocated to 'rent-seeking'; however, when actual government assistance becomes too high this dulls the pursuit of higher TFP as the 'rent seeking' effect dominates.

Table 1 around here

3. The extent of government assistance to Chinese firms

The data source used in this study covers medium- to large-sized firms belonging to 26 industries covering manufacturing and utilities for 1998-2007.[11] Table 1 presents information on the percentages that received assistance during this period, with firms sub-divided into those who only received tax holidays, subsidies, or both types of assistance. Information on subsidies received is reported by firms while tax holidays is calculated from taxes paid on profits and VAT combined with data on value-added and profits-before-tax for each firm. Firms that did not pay the full 17% rate of VAT or 33% profits tax are considered to have received a tax holiday.[12] Table 1 also reports the average tariff (ad valorem equivalent) on final imported goods as an additional source of assistance to firms, computed using the WITS (World Bank) database.[13]

The percentage of firms receiving government assistance increased from over 53% in 1998 to over 72% in 2007 (Table 1). The largest form of assistance was tax holidays, while the percentage of firms receiving only subsidies was relatively small (and fairly constant); those receiving both tax holidays and subsidies rose from around 4% of firms in 1998 to over 8% by 2007. During this period, and reflecting China joining the WTO at the end of 2001, protection from overseas competition declined with the average tariff rate declining from some 18% to 10% (see Table 24.1 in Harrison, 2014, for details on tariff rates across industries[14]).

Table 2 around here

[11] A discussion of the unbalanced panel dataset used - the annual accounting reports filed by industrial firms with the NBS over the period of 1998-2007 – is presented in Ding et. al. (2015). This dataset includes all SOEs and other types of enterprises with annual sales of five million yuan (about $817,000) or more. Brandt *et al*. (2012.) provide a thorough discussion of this dataset, which for present purposes covered nearly 600 thousand firms, which corresponds to some 2.2 million firm-year observations.

[12] The value attributed to any profits tax holiday is computed as: (0.33 × profits-before-tax) – profits tax paid. The value of any VAT holiday is (0.17 × value-added) – VAT paid. Du et. al. (2014), Harrison (2014) and Aghion et. al. (2015) provide further details.

[13] Others (e.g., Aghion et. al., 2015) have also included the 'implied' rate of interest firms paid on loans (calculated as interest payments divided by current liabilities) to measure the extent to which firms may have received loans at below-market interest rates. Certainly the implied interest across firms did decline between 1998 and 2004 (before rising again between 2004 and 2007) – see Figure U.1 in the unpublished appendix. However, the percentage of firms paying zero interest, because they had no borrowings, also rose dramatically from around 29% in 1998 to around 42% in 2007 (mostly due to the growth in importance of smaller privately-owned businesses during this period – see Table 1 in Ding et. al. (2015) – who were generally unable to secure loans from the Chinese banking system). Given this, no direct measure of the 'implied' cost of borrowing is included in this study (although, note, we do include measures on firm liquidity into our determinants of TFP – see Table 3 below).

[14] Table U.2 in the unpublished appendix provides the breakdown used in this study.

In terms of the financial value of assistance, Table 2 presents assistance rates (calculated using data on the total value of assistance divided by total value-added produced for each sub-group shown[15]) broken-down into type of assistance and by ownership categories. Relief from paying VAT at its full rate was the most valuable source of help received (worth between 5.9 – 7.5% of value-added during the period), followed by profit tax 'holidays' (increasing from around 2% in 1998 to nearly 5% in 2007). Direct subsidies were worth significantly less (on average around 1% of value-added over 1998-2007). Cumulatively, assistance rose from around 10% of value-added in 1998 to 13% by 2007; foreign-owned firms (including those based in special economic areas and Taiwan) received the highest rates of assistance, rising slowly over time, while (perhaps unexpectedly) SOEs as a sub-group received the lowest rates of assistance.[16]

Table 3 around here

4. The distribution of assistance across firms

In this section we report the results on estimating a Heckman model determining which firms received assistance and, for those who received help, their assistance rate. Table 3 firstly presents information on the mean values of the variables used in the Heckman model. Most of these variables are the same as those used in Ding et. al. (2015) when estimating TFP; further details on the variables and a justification for their use in this current study are available from this earlier paper. The additional variables used here comprise whether firms were assisted or not, the rate of assistance, a measure of new firm entry by industry/province/year and the imported final goods tariff rate. The latter two variables are included to assess if firms were more likely to be assisted if they were in industries and provinces with relatively higher entry rates (denoting lower barriers and/or greater competition), and if 'protected' domestic markets were more or less likely to have higher assistance.

[15] That is, not the average across firms – totals for each sub-group were instead used.

[16] Table U.3 in the unpublished appendix provides a breakdown of assistance rates across ownership sub-groups by type of assistance. It is also important to note that while SOEs had lower rates of assistance, the NBS data shows that in 1998 SOEs received nearly 39% of all assistance by value (¥64.6 of a total of ¥167.4 billion); in 2007 they received just over 14% of all assistance (¥207.9 of a total of ¥1,453.2 billion).

For all of the variables listed in Table 3 there is a significant difference between the mean values for assisted and non-assisted firms (in all cases significant at the 1% level based on a two-sided *t*-test). Thus assisted firms are larger and younger; more (less) likely to have no (high) political affiliations; more (less) likely to be foreign-owned (SOEs, collectively-owned); more likely to be exporters, undertake R&D, and operate in less competitive industries; less likely to operate in diversified city areas but more likely to be located in areas with higher industry agglomerations and in major cities; have lower fixed costs and higher liquidity (suggesting that the authorities were risk-adverse in their approach to selection); belong to industries and provinces with higher firm entry; face lower import tariffs; and are more likely to be located in Western China and the East Coast and less likely in Central China.

The Heckman model estimated is:

$$Assisted_{it} = \alpha_0 + \alpha_1\, Assisted_{it-1} + \alpha_2(High\ political\ affiliation \times SOE)_{it} + \alpha_x Z_{it} + \mu_{it} \quad (1)$$

$$\ln(assistance\ rate)_{it} = \beta_0 + \beta_1 \ln(assistance\ rate)_{it-1} + \beta_2(High\ political\ affiliation \times SOE)_{it} + \beta_x X_{it} + \lambda\, IMR_{it} + \epsilon_{it} \quad (2)$$

where Z_{it} and X_{it} are sets of control variables determining the probability of being assisted and the intensity of assistance; and IMR is the inverse of the Mills' ratio (hence $\lambda = \sigma\rho$, where ρ measures corr($\mu_{it}\epsilon_{it}$) while σ measures the standard deviation of ϵ_{it}). A wide range of control variables (see Table 3, plus additionally year and industry dummies) initially comprising $W_{it} \in X_{it} \cup Z_{it}$ were allowed to enter equations (1) and (2), with the model being identified by the non-linearity of the probit equation; a stepwise approach was then used to impose exclusion restrictions on the two parts of the model so that there were (statistically significant) variables in X_{it}, Z_{it} such that $X_{it} \not\subset Z_{it}$ and vice versa. Note, equations (1) and (2) also included an additional composite variable comprising whether the firm had high-level political connections with central or provincial governments *and* was also an SOE; the expectation being that such firms would have an even greater likelihood of being in receipt of government assistance.

Table 4 around here

Table 4 presents the results from estimating equations (1) and (2) using the Heckman procedure in STATA. With regard to the selection equation determining which firms received assistance, marginal effects ($\partial\hat{p}/\partial x$) are reported indicating that firms assisted in $t-1$ were some 89% more likely to be assisted in period t, suggesting that a large degree of persistence in who was granted assistance. Larger firms were also more likely to receive government help, and the probability of being assisted increased over time. Older firms were (cet. par.) less likely to receive help, while those with either no or high political connections (vis-à-vis the benchmark group with connections to local government) had around a 2-2.5% less likelihood of being assisted. SOEs also had a 4.2% lower probability of being assisted. Because the marginal effects are calculated taking account of any interactions between variables, these results based on political connections and SOE status do not show separately the underlying effect for firms with high-level political connections with central or provincial governments and being an SOE;[17] the underlying estimate of $\hat{\alpha}_2$ in equation (1) is reported in the footnote to the table, indicating that while strong political connections and being an SOE are negatively related to receiving assistance, the joint-effect of being both was strongly positive towards receiving assistance.

Foreign-owned firms (covering all those owned by companies outside mainland China) had higher likelihoods of being assisted, as were exporters (3.3% more likely) and those undertaking R&D (1.6% more likely). Operating in less competitive industries and being located in more diversified areas increased the probability of assistance, while areas with higher levels of agglomeration experienced lower chances of being assisted. Higher fixed costs and/or negative liquidly acted against being assisted, while those firms belong to industries/provinces with higher firm entry benefited from being more likely to receive assistance. Firms belonging to industries with higher tariff rates received a lower likelihood of assistance, while being located in the north east area

[17] Note, where there is an interaction term only one overall marginal effect is calculated since the marginal effects command in STATA 'solves out' the overall impact of each variable (∂x_1) on the probability of being assisted ($\partial\hat{p}$) – i.e., if all three terms $x_1, x_2, x_1 \times x_2$ enter the model, then changing the interaction term $x_1 \times x_2$ cannot impact on $\hat{p}$ independently of changing x_1, x_2 so it is not really feasible to try to explain the impact of $x_1 \times x_2$ in isolation of x_1, x_2.

of China (Liaoning, Jilin or Heilongjiang provinces) increased the probability of being assisted (vis-à-vis other areas[18]). Being located in a major city also reduced the chance of being assisted (cet. par. by some 5.5%), while there were large differences across industries (10% more likely in agricultural and food processing versus between 22-30 less likely to receive assistance if the firm belonged to the tobacco, petroleum processing and petroleum and gas extraction sectors).

As to whether firms received higher rates of assistance (when assistance > 0), Table 4 shows that (cet. par.) firms with a 10% higher assistance rate in $t-1$ had a 4.7% higher rate of assistance in period t; again this confirms that there was significant continuity with regard to who was assisted and by how much. The results for other variables are also similar (in terms of their direction) to those obtained from the selection equation. The major exceptions are that larger firms and those undertaking R&D received (cet. par.) less assistance; while SOEs achieved higher assistance rates, especially if they also had strong political connections (the latter sub-group attained a 4.2% higher rate of assistance[19]). In certain industry sectors the signs attached to the $\hat{\alpha}_x, \hat{\beta}_x$are either of opposite sign (e.g. food production) or more commonly statistically zero for one of the parameter estimates (e.g., textiles). Overall, ρ – measuring the correlation between $(\mu_{it}\epsilon_{it})$, and thus the extent to which there is a selection problem – is significant and positive, showing that the unobservable factors that determine whether a firm is assisted are correlated with unobservable factors that positively determine the rate of assistance received.[20]

Overall, the results obtained suggest that the distribution of assistance across firms is likely to have both positive and negative effects on competitiveness (and productivity). Firstly, the high degree of persistence in who gets assistance (and assistance rates) suggests that rent-seeking activity may have been prevalent, especially as larger firms operating in high concentration industries and with greater liquidity especially benefited, particularly if they were SOEs with strong political

[18] Note, after the north east area, firms located in the east coast were next in terms of having a higher probability of receiving assistance (and receiving higher assistance rates).

[19] I.e., $e^{(-0.019+0.016+0.044)}-1$

[20] Based on $\hat{\lambda}\overline{IMR}_{it}$, which equals 0.101, this shows by how much conditional assistance rates are shifted up due to the selection effect; a firm with average characteristics which is selected into receiving assistance obtains a $100\times[e^{0.101}-1] = 10.6\%$ higher assistance rate than a firm (with average characteristics) drawn at random from the population.

connections. However, our results also show that factors likely to be associated with positive links to competitiveness were also present: younger firms, exporters, those that were foreign-owned (with presumed technological advantages), those undertaking R&D, and those operating in sectors with high new firm entry rates and lower tariffs, were likely to be targeted for government help.[21] Thus, in the next section the direct impact of receiving assistance on TFP is estimated using firm-level production functions.

5. The direct impact of assistance on firms' productivity

In this section we present some empirical findings on the relationship between the rate of government assistance received and TFP. The methodology (and justification for its use[22]) has been fully set out in in Ding et. al. (2015), where a system Generalised Methods of Moments (GMM) approach was used to estimate log-linear Cobb-Douglas gross-output production functions for 26 industries in China, using annual firm-level National Bureau of Statistics (NBS) data for 1998-2007. Specifically, we estimate the following model:

$$y_{it} = \alpha_i + \alpha_E e_{it} + \alpha_M m_{it} + \alpha_K k_{it} + \alpha_X X_{it} + \alpha_T t + \varepsilon_{it} \quad (3)$$

where endogenous y, e, m and k refer respectively to the logarithms of real gross output, employment, intermediate inputs, and the capital stock in firm i at time t ($i = 1, \dots, N;\ t = 1, \dots T$); and X_{it} is a vector of observed (proxy) variables determining TFP. In particular we include dummy variables measuring the rate of assistance received (compared to the benchmark sub-group who received no assistance); also included into the vector $X_{it}$are firm characteristics such as firm age, political affiliation, firm ownership, export behavior, whether the firm engaged in R&D, financial

[21] There is also some tentative evidence that industries with higher levels of technology and value-added benefited vis-à-vis other sectors. The main beneficiaries (cet. par.) were: agriculture, timber, basic chemicals, standard machinery, ICT, electrical machinery & equipment, measuring instruments, and gas production; the main 'losers' were: beverages, tobacco, paper making, printing, petroleum processing, rubber, metal products, electric power, water production, coal mining, and petroleum & natural gas extraction.

[22] Such as the need to use a fixed-effects estimator; the strengths of the approach versus the Olley and Pakes (1996) and Levinsohn and Petrin (2003) approaches; the need to estimate a gross-output versus value-added production function; and the consistency of estimating TFP using a single-stage (rather than multi-stage) approach.

variables, and geographic location (Table 3 above provides a list of most all of the variables used, with other set out in Table 1 in Ding et. al., op. cit.). Lastly, t is a time trend, measuring exogenous gains in TFP over time.

Equation (3) – in dynamic form with additional lagged values of output and factor inputs – is estimated using the two-step XTABOND2 system GMM approach (Arellano and Bond, 1991) implemented in STATA (this also involves correcting for any potential finite sample bias using Windmeijer's, 2005, approach). Thus equation (3) is estimated both in first-differences and in levels, allowing for fixed effects and tackling endogeneity of the right-hand-side variables (including the lagged dependent variable) and selection bias by using lagged values of the endogenous variables as instruments in the first differences equation, and first-differences of the same variables as instruments in the levels equation (Blundell and Bond, 1998)[23]. In this study, gross output, intermediate inputs, labour, and capital are treated as endogenous, as well as assistance rates, political affiliation, capital ownership, exporting, and R&D. Lastly, according to Arellano and Bond (1991), the presence of second-order autocorrelation implies that the estimates are inconsistent. Panel tests for autocorrelation are used to establish whether second-order correlation is an issue.

Table 5 around here

The detailed results from estimating equation (3) for 26 two-digit industries/industry groups are presented in Table U.1 (in the unpublished appendix). These are very similar to those presented in Ding et. al. (2015), to which the interested reader is directed for a full discussion. Here we concentrate on the parameter estimates for the assistance variables (Table 5, top half). Firstly, as the diagnostics show, the models estimated pass various tests of the validity of the instruments used and tests for autocorrelation. All the models for the 26 industries pass the Hansen test for over-identification at the 10% level or better, suggesting the validity of the instrument set used. With regard

[23] We use Roodman's (2009) 'collapse' procedure in all our estimations using XTABOND2 in STATA, such that only the instruments applicable to each variable – not the full instrument set covering all variables – are used. Too many instruments have been shown to often result in a Hansen *p*-value at or very close to 1.

to tests for autocorrelation, none show evidence of second-order serial correlation in the differenced residuals (based on a 10% significance level), suggesting the overall consistency of our estimates.

Table 5 shows that in 11 out of 26 industries the impact of assistance on TFP increases monotonically for those firms that receive less than 10%, 10-19% and 20-49% assistant rates; for a further 10 industries assistance rates between 1-9% have a significantly positive effect while the impact is greater for those in receipt of 10-19% assistance rates, and approximately the same for those receiving 20-49% compared to 10-19% assistance. Only for the petroleum sector, measuring instruments, electronic power generation and gas production is there a decline in the positive impact of assistance on TFP for the 20-49% sub-group compared to 10-19%. Tobacco is the only sector where assistance (for any sub-group) has no statistically significant impact on TFP. In 9 industries firms with assistance rates 50+% experienced significant declines in TFP (especially coal mining, electronic power generation and water production), while in nonmetal products receiving 50+% assistance boosted TFP by 5.7% and in metal products the impact was 13.7% higher TFP (only in the latter sector does TFP increases monotonically across all assistance rate sub-groups).

On average across all 26 industries, the parameter estimates in Table 5 show that firms receiving assistance rates of 1-10%, 10-19%, 20-49% and 50+% experienced on average 4.5%, 9.4%, 9.2% and -3% gains in TFP, respectively.[24] This complements the result obtained by Aghion et. al. (2015) that "… driving the Herfindahl for the dispersion of tax holidays on income taxes and value-added taxes to 0 would lead to an increase in TFP of 8.5 to 10.3 percentage points" (pp. 15-16). Thus both studies show that assistance to industry in China has a direct and an indirect impact on firm-level TFP.

Lastly, as a check on our results, we also re-estimated equation (3) using a 'matched' sample approach (Imbens and Rubin, 2015). Separately for each of the 26 industries covered here we used a propensity-score approach based on estimating equation (1) to predict the likelihood of receiving assistance and then used one-to-one 'matching' to create an overlapping 'treatment' and 'control'

[24] This is based on taking a simple average across all industries (irrespective of whether parameter estimates were statistically significant or not) and expressing the results as $e^{\Sigma \alpha} - 1$.

group of firms (the STATA procedure PSMATCH2 was used). This smaller sample was then used to re-estimate equation (3) – using system-GMM but this time not instrumenting assistance rates – with the key results reported in Table 5 (lower half). Tests of the appropriateness of the 'matching' technique (using PSTEST in STATA) based on Rubin's B and R show that the 'treatment' and 'control' groups are sufficiently balanced. Moreover, the results obtained with respect to the parameter estimates attached to the assistance rate dummies are generally similar; the averages across all industries of the impact of assistance on TFP for the various sub-groups are less than 10 percentage points different when the 'full' data and 'matched' data results are compared. This confirms that the estimates produced in Table 5 (top half) of the impact of assistance on TFP are indeed robust.

6. Summary and conclusions

Industrial policy, particularly through the provision of large-scale assistance to industry in the form of 'tax holidays' and subsidies to firms, is very important in China (e.g., the data used here for medium- to large-sized firms in manufacturing and utilities shows that in 2007 over 72% of firms received government assistance, worth around 13% of their value-added). Recently Aghion et. al. (2015) have reported that the distribution of government assistance to firms in China has enhanced productivity over the 1998-2007 period, given that it was allocated to competitive sectors and /or fostered competition in a sector. However, they did not test directly whether receiving assistance had a direct impact on each firms' TFP, perhaps thereby introducing distortions that work against the productivity-enhancing effects associated with the distribution of assistance.

The major contribution of this paper has been to use Chinese firm-level panel data for 1998-2007 to both model (using the Heckman approach) which firms received assistance (and if so, the rate of assistance provided) and then to introduce measures of assistance received by each firm directly into industry-level production functions determining firm output. The latter were estimated using a system-GMM econometric approach with assistance instrumented by its lagged valued); and by estimating production functions using 'matched' data comprising firms receiving assistance and

firms not receiving 'treatment' who nonetheless had very similar characteristics to the assisted sub-group.

In terms of our results regarding who gets assistance (and assistance rates), they suggest that the distribution of assistance across firms is likely to have both positive and negative effects on competitiveness (and productivity). There was high degree of persistence across time in terms of which firms benefited, suggesting that rent-seeking activity may have been prevalent, especially as larger firms operating in high concentration industries and with greater liquidity were favoured, particularly if they were SOEs with strong political connections. However, our results also showed that factors likely to be associated with positive links to competitiveness were also present: younger firms, those that were foreign-owned (with presumed technological advantages), exporters and those operating in sectors with high new firm entry rates and lower tariffs, were likely to be targeted for government help

With regard to estimating industry production functions (using both system-GMM and 'matching' approaches) the results indicated that, across the 26 industries considered, Chinese firms that received assistance had higher TFP during 1998-2007, although there is some evidence that too high a level of assistance has negative consequences for TFP. On average the results showed that firms receiving assistance rates of 1-10%, 10-19%, 20-49% and 50+% experienced on average 4.5%, 9.4%, 9.2% and -3% gains in TFP, respectively.

Turning to further work that could be done, we have not at this stage set out to test if different forms of assistance (i.e., different types of tax holidays as well as subsidies to firms) have differential impacts. Our initial attempts to do this using system-GMM appeared to suffer from collinearity problems, so further experimentation with regard to modelling is necessary. It would also be useful to consider the extent to which productivity growth differed across various sub-groups of firms (e.g., by ownership) separately for 'assisted' and noon-assisted' firms, while at the same time decomposing such growth into 'within' firm contributions and the contributions of the entry and exit of firms. A Haltiwanger (1997) type of approach would suit this type of work. Taking this a stage further, it

would also be interesting to model directly the impact of assistance on the (hazard rate of) firm closure.

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Appendix

We provide a simple agency model to show that government subsidies generally provide an incentive to pursue higher TFP, but over-assistance may induce the manager to substitute managerial effort by rent-seeking effort, which consequently lowers TFP.

Consider a firm controlled by a manager who can exert two kinds of managerial effort: profit-seeking effort and rent-seeking effort. The first increases product quality as perceived by the consumer and hence increases the market demand of the product and finally the profitability of the firm; while rent-seeking effort allows the manager to engage in personal reward to directly benefit herself. The total effort of the manager is finite so she faces a trade-off between the two kinds of effort.

For simplicity, the firm employs a Cobb-Douglas function:

$$Y = e^{\omega} E^{\alpha_E} M^{\alpha_M} K^{\alpha_K} \tag{A.1}$$

where Y, E, M and K refer to output, employment, intermediate inputs and capital stock; ω is the physical productivity of the firm, and we assume constant return to scale so $\alpha_E + \alpha_M + \alpha_E = 1$. With imperfect competition, demand is:

$$Y = P^{\eta} e^{f(x)} \tag{A.2}$$

and we assume the elasticity of demand is $\eta < -1$; P is the price of the product; and $f(x)$ is the quality of the product which is a function of the managerial profit-seeking effort x. We assume $f(x)$ is increasing in x. Factor prices are P_E, P_M, and $P_K(\gamma)$, and in particular the 'user' cost of capital $P_K(\gamma)$ is a function of government assistance γ (with $\frac{\partial P_K}{\partial \gamma} < 0$).

Given managerial effort and subsidies, the firm chooses labor, material, and capital to maximise profit, subjective to the production function (A.1) and the demand curve (A.2):

$$\pi_f(x, \gamma) = \max_{E,M,K} PY - P_E E - P_M M - P_K(\gamma) K \tag{A.3}$$

After some manipulation, the profit function can be shown to be:

$$\pi_f(x, \gamma) = \Phi [P_K(\gamma)]^{(1+\eta)\alpha K} e^{-\omega(1+\eta)+f(x)} \tag{A.4}$$

where $\Phi = (-\frac{1}{\eta})(\frac{\eta}{\eta+1})^{\eta+1} [P_E^{\alpha_E} P_M^{\alpha_M} \frac{1}{\alpha_E^{\alpha_E} \alpha_E^{\alpha_M} \alpha_K^{\alpha_K}}]^{\eta+1}$, which does not involve x or γ.

As well as managerial effort to boost product quality, managers can also exert rent-seeking effort q:

$$\pi_r(q, \gamma) = \gamma g(q) \tag{A.5}$$

where $g(q)$, the share of government assistance that directly rewards management, is increasing in rent-seeking effort q. Assuming that the nominal salary of managers is a share β of firm profit, we can write the problem of the manager as:

$$\max_{x,q} \beta \pi_f(x, \gamma) + \pi_r(q, \gamma) \tag{A.6}$$

subject to the constraint that total effort $(x + q) = 1$. This imposes a trade-off for the manager of allocating her effort between pursuing TFP (hence higher profit) and pursuing rent-seeking to boost her private rewards without having to make the effort of boosting TFP.

To simplify the solution of the problem (and without loss of generality), we set $f(x) = x$ and $g(q) = e^{q-1}$, and $P_K(\gamma) = e^{-\gamma} \bar{P}_K$ where $\bar{P}_K = 1$ is the normalised market 'user' cost of capital. Thus, the first order condition of the manager's problem is

$$\beta \Phi [P_K(\gamma)]^{(1+\eta)\alpha K} e^{-\omega(1+\eta)+x} - \gamma e^{-x} = 0 \tag{A.7}$$

where the first term measures the marginal return to managerial effort from firm profit that determines nominal salary, while the second term represents the marginal return of managerial effort from rent-seeking. The former is positive while the latter is negative (as she has less rent-seeking effort to spend the more profit-seeking effort is allocated). The trade-off between the two implies optimal managerial effort is:[25]

$$x^*(\gamma) = \frac{1}{2}[(\eta+1)\omega - ln\beta\Phi + ln\gamma + \alpha_K(1+\eta)\gamma] \quad \text{(A.8)}$$

Note that $x^*(\gamma)$ is a concave function of γ, with a maximum at $\gamma^* = \frac{-1}{\alpha_K(1+\eta)}$.[26] Also, measured TFP is:

$$TFP(\gamma) = \frac{-1}{\eta}[x^*(\gamma) - \omega(1+\eta)] \ = \frac{-1}{2}[(\eta+1)\omega - ln\beta\Phi + ln\gamma + \alpha_K(1+\eta)\gamma] \quad \text{(A.9)}$$

As $\eta < -1$, measured TFP is higher if physical productivity ω is higher. More importantly, assistance generally increase TFP except when assistance is too high. This is summarized in the following proposition.

Proposition 1: When $\gamma < \gamma^*$, $x^*(\gamma)$ and $TFP(\gamma)$ are increasing in γ; when $\gamma \geq \gamma^*$, $x^*(\gamma)$ and $TFP(\gamma)$ are decreasing in γ.

That is, government subsidies lower the marginal cost of production and provide an incentive to the manager to allocate more effort to pursue higher profitability (via higher TFP), but over-assistance induces the manager to substitute managerial effort by rent-seeking effort, and consequently lowers TFP.

[25] Note that we can shift the location of productivity ω to make sure the optimal choice is between 0 and 1, without loss of generality.

[26] Note that $\eta < -1$, so $\gamma^* > 0$. We assume $\alpha_K > \frac{-1}{(1+\eta)}$, so $\gamma^* < 1$. Thus, the optimal effort is an interior solution.

Table 1: Percentage of firms[a] receiving tax holidays[b], subsidies or both, China 1998-2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
No assistance given	47.3	40.6	33.9	34.3	32.9	32.6	32.8	30.1	29.5	27.6
Only tax holidays	43.8	50.3	55.8	55.2	55.2	57.6	53.2	56.8	57.8	60.2
Only subsides given	5.1	7.3	4.4	4.5	4.8	3.7	5.2	4.9	4.4	3.9
Both tax holiday and subsidies	3.8	1.8	6.0	6.0	7.0	6.0	8.8	8.1	8.2	8.3
Average tariff (AVE) on imports	18.42	17.72	17.47	16.35	12.97	11.47	10.37	9.70	9.66	10.04

[a] Covers manufacturing, mining and utilities. Source: NBS data and WITS (World Bank)
[b] Reduced VAT rate and/or reduced profit tax rate

Table 2: Value of assistance to industry as a percentage of total value-added produced, China 1998-2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
All firms[a]										
Value-added not taxed at 17% rate	6.1	6.9	5.9	6.7	6.5	6.5	7.4	7.3	7.5	7.5
Profits not taxed at 33%	2.2	1.1	4.4	3.8	3.8	4.2	4.4	4.3	4.5	4.8
Subsidised income	1.5	0.9	1.3	1.1	1.2	0.9	1.1	1.1	1.0	0.7
Total assistance[b]										
All firms	9.8	8.8	11.6	11.6	11.5	11.6	12.9	12.7	12.9	13.0
Foreign-owned	13.4	9.8	15.3	15.1	16.6	16.9	17.8	17.1	17.1	17.4
SOE's	8.6	8.6	10.4	10.7	8.2	8.0	8.7	9.2	10.4	10.4
HK/Macao/Taiwan-owned	14.0	9.5	15.6	16.1	16.6	16.3	17.8	16.8	15.6	16.1
Owned by collectives	10.4	8.3	11.5	11.6	12.1	12.1	13.5	12.8	12.7	12.5
Owned by private companies	9.0	9.1	11.2	10.8	11.6	11.6	12.8	12.4	12.5	12.6

[a] Covers manufacturing, mining and utilities. Source: NBS data
[b] Each firm was assigned to the ownership sub-group which had 50+% of its share capital. When no sub-group had 50+% then the sub-group with the largest percentage share was used.

Table 3: Descriptive statistics for variables used in determining assistance to firms, China 1998-2007

		Assistance > 0		All firms	
Variable	Description	$\bar{X}$	σ	$\bar{X}$	σ
ln assistance rate	*ln* (100 × value of all assistance ÷ value added)	2.600	0.67	–	–
Assisted	Dummy variable = 1 if firm received assistance	–	–	0.592	0.49
ln employment	*ln* numbers employed in firm	4.803	1.17	4.769	1.18
ln firm age	*ln* firm age (based on year-of-birth)	2.130	0.89	2.220	0.91
No political affiliation	No political connections	0.568	0.50	0.516	0.50
High political affiliation	Political connections with central or provincial governments	0.050	0.22	0.063	0.24
Foreign-owned	Dummy variable = 1 if proportion of capital owned that is foreign-owned >=0.5[a]	0.085	0.28	0.065	0.25
SOE	Dummy variable = 1 if proportion of capital owned by state >=0.5 [a]	0.100	0.30	0.146	0.35
HK/Macau/Taiwan-owned	Dummy variable = 1 if proportion of capital owned that is HK/Macau/Taiwan-owned >=0.5 [a]	0.089	0.29	0.069	0.25
Collective-owned	Dummy variable = 1 if proportion of capital owned by collectives >=0.5 [a]	0.113	0.32	0.125	0.33
Exporter	A dummy variable for firms that export	0.287	0.45	0.251	0.43
R&D dummy	Dummy variable = 1 if firm undertook any spending on R&D	0.117	0.32	0.109	0.31
ln Agglomeration	*ln* % of industry output (2-digit SIC) located in each province in which firm is located – MAR-spillovers	1.758	1.16	1.730	1.17
ln Herfindahl	*ln* Herfindahl index of industrial concentration (by 2-digit SIC)	-6.368	0.98	-6.325	1.01
ln Diversification	*ln* proportion of 3-digit industries (maximum 226) located in (208) city areas in which firm is located – Jacobian spillovers	-0.654	0.36	-0.650	0.38
ln Fixed costs	*ln* selling & distribution costs as % of sales	1.073	0.86	1.084	0.90
ln liquidity	Dummy variable = 1 if ratio of (current assets – current liabilities) to total assets ≤ 0	0.134	0.16	0.122	0.15
Neg_liquid	*ln* [1 +ratio of (current assets – current liabilities) to total assets]	0.386	0.49	0.426	0.49
Proportion new firms	No. new firms ÷ no. existing firm for each 2-digit industry SIC/province/year	0.024	0.03	0.022	0.03
Tariff rate (fob final goods)	Percentage rate of ad valorem tariff (fob final goods) for 44 industries (source: WITS, Worldbank)	12.232	6.94	12.488	7.48
Western China	Dummy = 1 for firm located in Xinjing, Tibet, Gansu, Qinghai, Sichuan, Chongqing, Yunnan, Guizhou, Guangxi, Inner Mongolia	0.655	0.48	0.650	0.48
East Coast	Dummy = 1 for firm located in Guangdong, Fujian, Zhejiang, Jiangsu, Shandong, Hainan, Hebrei, Beijing, Tianjin, Shanghai	0.168	0.37	0.164	0.37
Central China	Dummy = 1 for firm located in Hunan, Jiangxi, Hubei, Anhui, Henan, Shanxi	0.113	0.32	0.119	0.32
City 200	Dummy = 1 for firm located in top 200 cities based on population size	0.817	0.39	0.780	0.41
N (thousands)			1,293		2,184

[a] For firms with <50% share ownership in a particularly category, they were assigned to the largest ownership sub-group

Source: NBS data

Table 4: Heckman model of assistance provided to Chinese firms, 1998-2007

Dependent variable:	*ln* assistance rate		Assisted (0/1)	
	$\hat{\beta}$	z-value	$\frac{\partial \hat{p}}{\partial x}$	z-value
ln assistance rate$_{t-1}$	0.468	446.77	–	–
Assisted$_{t-1}$			0.891	400.92
ln employment	-0.015	-21.05	0.008	21.40
1999	-0.023	-6.59	-0.071	-23.92
2000	0.014	2.81	-0.100	-32.57
2002	0.013	3.86	-0.026	-12.34
2003	0.006	1.73	-0.014	-6.69
2004	0.044	12.17	-0.021	-9.59
2005	-0.005	-1.37	-0.013	-6.38
2006	0.003	0.89	0.008	4.24
2007	0.013	3.89	0.031	16.34
ln firm age	-0.009	-7.49	-0.025	-44.57
No political affiliation	-0.009	-4.64	-0.020	-18.98
High political affiliation[a]	-0.019	-4.00	-0.025	-9.77
Foreign-owned	0.078	25.88	0.062	43.34
SOE[a]	0.016	4.27	-0.042	-22.46
HK/Macau/Taiwan-owned	0.054	18.86	0.053	37.29
Collective-owned	0.031	12.33	0.004	3.12
High affiliation x SOE[a]	0.044	6.16	n.a.	
Exporter	0.035	17.38	0.033	32.12
R&D dummy	-0.034	-15.66	0.016	13.07
ln Agglomeration	-0.020	-22.95	-0.009	-18.33
ln Herfindahl	0.006	3.76	0.064	109.51
ln Diversification	0.025	6.41	0.075	47.77
ln Fixed costs	-0.017	-17.69	-0.017	-35.89
ln liquidity	0.130	22.55	0.019	5.41
Neg_liquid	-0.001	-0.38	-0.042	-36.72
Proportion new firms	0.102	3.54	0.163	8.92
Tariff rate (fob final goods)	-0.001	-6.06	-0.001	-9.38
Western China	-0.040	-10.79	-0.075	-40.74
East Coast	-0.019	-5.80	-0.027	-14.15
Central China	-0.034	-9.16	-0.038	-18.13
City 200	-0.021	-7.11	-0.055	-48.29
Industry				
Agricultural and food processing	0.135	32.43	0.101	48.98
Food production	0.026	5.12	-0.022	-6.92
Beverage	–	–	-0.078	-17.39
Tobacco	-0.244	-8.75	-0.242	-17.62
Textiles	–	–	0.003	1.60
Timber	0.040	7.93	-0.010	-3.18
Papermaking	-0.039	-8.01	-0.071	-27.99

Printing	-0.059	-9.28	-0.066	-20.42
Cultural	0.036	5.64	–	–
Petroleum processing	-0.056	-5.15	-0.222	-43.27
Basic chemicals	0.014	4.68	–	–
Medical instruments	-0.037	-6.84	–	–
Rubber	–	–	-0.114	-28.71
Metal products	-0.021	-5.34	-0.092	-52.23
Standard machinery	–	–	0.029	19.89
Transport equipment	–	–	-0.129	-55.37
ICT, electrical machinery & equipment	0.028	9.96	–	–
Measuring instruments	0.051	8.82	–	–
Other manufacturing	–	–	-0.018	-7.11
Electric power	-0.103	-11.52	-0.242	-74.99
Gas production	0.202	12.47	–	–
Water production	–	–	-0.193	-42.35
Coal mining	-0.048	-5.94	-0.189	-54.48
Petroleum & Natural Gas extraction	–	–	-0.297	-16.78
λ	0.084	4.49		
ρ	0.147	4.49		
N	599,982		1,303,974	

[a] The underlying parameter estimates for the selection equation with regard to 'High political affiliation', 'SOE' and 'High affiliation x SOE' were -0.113 (-11.46), -0.158 (-24.21) and 0.206 (14.71), respectively (*z*-values in parenthesis).

Table 5: Long-run impact on TFP of assistance to firms (26 industries, China, 1998-2007)

Dependent variable: *ln* sales	Other Mining (SIC10+80)	Food production (SIC14)	Tobacco (SIC16)	Textile (SIC17)	Apparel &footwear (SIC18)	Leather (SIC19)	Timber (SIC20)	Furniture (SIC21)	Paper-making (SIC22)
Results for assistance variables based on 'full' data sample									
Assistance rate <10%	0.027***	0.064***	0.022	0.024***	0.034***	0.019***	0.057***	0.042***	0.035***
	4.40	*7.48*	*0.57*	*5.57*	*3.86*	*4.60*	*5.99*	*5.53*	*10.54*
Assistance rate 10-<20%	0.069***	0.091***	0.013	0.083***	0.081***	0.035***	0.094***	0.080***	0.066***
	11.07	*7.93*	*0.25*	*7.73*	*4.10*	*4.39*	*8.75*	*9.87*	*16.23*
Assistance rate 20-<50%	0.080***	0.087***	0.067	0.101***	0.079***	0.035***	0.113***	0.092***	0.060***
	7.24	*4.67*	*0.84*	*6.19*	*2.96*	*2.57*	*5.54*	*8.59*	*9.52*
Assistance rate 50+%	-0.011	0.028	-0.109	0.001	-0.062*	-0.013	-0.017	0.002	-0.043***
	-0.45	*0.88*	*-1.00*	*0.06*	*-1.84*	*-0.81*	*-0.47*	*0.09*	*-2.98*
Observations	22,089	23,186	2,244	112,526	65,023	24,872	38,762	22,091	30,420
Number of firms	9,426	8,850	483	35,007	20,534	9,209	12,942	6,960	10,230
AR(2) z-statistic p-value	0.731	0.155	0.785	0.293	0.921	0.223	0.131	0.288	0.735
Hansen test p-value	0.122	0.127	0.538	0.163	0.250	0.396	0.667	0.158	0.223
Results for assistance variables based on 'matched' data sample[a]									
Assistance rate <10%	0.031***	0.053***	0.048	0.019***	0.040***	0.023***	0.060***	0.037***	0.035***
	4.55	*6.94*	*1.18*	*5.05*	*3.56*	*5.22*	*6.57*	*4.61*	*9.50*
Assistance rate 10-<20%	0.072***	0.078***	-0.015	0.076***	0.088***	0.045***	0.095***	0.071***	0.065***
	10.06	*7.62*	*-0.23*	*7.49*	*3.68*	*5.96*	*9.71*	*8.30*	*15.58*
Assistance rate 20-<50%	0.083***	0.077***	-0.011	0.094***	0.082**	0.049***	0.127***	0.081***	0.059***
	6.60	*4.41*	*-0.14*	*6.15*	*2.42*	*3.21*	*6.44*	*7.34*	*8.39*
Assistance rate 50+%	-0.005	0.006	-0.167	-0.006	-0.060	-0.020	0.021	-0.006	-0.048***
	-0.21	*0.18*	*-1.55*	*-0.35*	*-1.60*	*-1.15*	*0.66*	*-0.25*	*-3.28*
Observations	12,110	14,063	1,227	93,680	55,242	14,942	23,605	13,361	18,110
Number of firms	6,014	6,154	389	32,324	18,939	6,333	8,909	4,890	7,370
Rubins' B	20.9	18.9	20.1	10.9	12.6	15.5	14.5	18.7	15.7
Rubins' R	1.08	0.92	1.06	0.93	0.96	1.03	1.02	1.05	1.12

Source: Table U.1 (unpublished appendix). *z*-statistics in italics and parenthesis. ***/**/* significant at 1/5/10% level.

[a] 'matched' sample comprising treatment and control group obtained using propensity score matching for each industry. Rubin (2001) recommends that B be less than 25 and that R be between 0.5 and 2 for the samples to be considered sufficiently balanced.

Table 5: (cont.)

Dependent variable: *ln* sales	Printing (SIC23)	Cultural (SIC24)	Petroleum Processing (SIC25+70)	Chemical (SIC26+28)	Medical (SIC27)	Rubber (SIC29)	Plastic (SIC30)	Nonmetal products (SIC31)	Metal products (SIC32+33+34)
Results for assistance variables based on 'full' data sample									
Assistance rate <10%	0.069***	0.055***	0.016	0.031***	0.043***	0.063***	0.018***	0.047***	-0.016
	10.43	*7.68*	*1.09*	*9.65*	*5.47*	*5.10*	*3.09*	*3.43*	*-1.31*
Assistance rate 10-<20%	0.109***	0.110***	0.088***	0.075***	0.101***	0.103***	0.054***	0.086***	0.083***
	14.02	*10.36*	*3.73*	*23.69*	*12.34*	*9.12*	*4.01*	*6.27*	*3.30*
Assistance rate 20-<50%	0.114***	0.131***	0.069**	0.073***	0.116***	0.113***	0.055***	0.104***	0.082**
	7.14	*10.84*	*2.05*	*16.04*	*8.59*	*5.36*	*4.65*	*3.92*	*2.34*
Assistance rate 50+%	-0.019	-0.054**	-0.032	-0.006	0.001	0.021	-0.028	0.055*	0.128***
	-0.84	*-1.96*	*-0.72*	*-0.61*	*0.03*	*0.64*	*-1.32*	*1.89*	*2.75*
Observations	36,663	24,426	8,544	73,792	23,574	22,894	54,610	118,081	91,234
Number of firms	10,168	6,962	3,061	26,817	7,328	6,611	18,174	35,083	32,525
AR(2) z-statistic p-value	0.681	0.270	0.177	0.482	0.690	0.293	0.143	0.219	0.133
Hansen test p-value	0.226	0.159	0.646	0.111	0.247	0.233	0.441	0.102	0.334
Results for assistance variables based on 'matched' data sample[a]									
Assistance rate <10%	0.056***	0.052***	0.014	0.026***	0.042***	0.048***	0.013**	0.044**	-0.017
	10.16	*6.43*	*0.86*	*8.54*	*5.56*	*4.88*	*2.25*	*2.33*	*-1.18*
Assistance rate 10-<20%	0.098***	0.100***	0.088***	0.068***	0.092***	0.082***	0.041***	0.084***	0.105**
	15.40	*9.57*	*3.35*	*21.28*	*11.33*	*7.18*	*3.17*	*3.99*	*2.54*
Assistance rate 20-<50%	0.080***	0.122***	0.072**	0.067***	0.104***	0.083***	0.044***	0.102***	0.117**
	5.71	*10.06*	*1.96*	*15.20*	*7.96*	*4.38*	*3.76*	*2.58*	*2.04*
Assistance rate 50+%	-0.047**	-0.057*	-0.038	-0.023**	-0.009	-0.009	-0.016	0.041	0.171**
	-2.40	*-1.93*	*-0.74*	*-2.22*	*-0.37*	*-0.30*	*-0.95*	*1.09*	*2.25*
Observations	18,443	15,290	6,657	46,149	15,390	13,856	44,588	94,455	73,534
Number of firms	6,795	4,994	2,728	19,266	5,646	4,820	16,427	32,112	29,099
Rubins' B	12.4	18.8	16.5	11.0	12.4	16.3	12.2	9.7	10.9
Rubins' R	0.88	1.04	0.99	0.93	0.93	0.93	0.97	0.92	0.95

Table 5: (cont.)

Dependent variable: *ln* sales	Machinery & Equipment (SIC35+36)	Transport equipment (SIC37)	Measuring instrument (SIC41)	Other manufacturing (SIC42+43)	Electronic power (SIC44)	Gas production (SIC45)	Water production (SIC46)	Coal Mining (SIC60)
Results for assistance variables based on 'full' data sample								
Assistance rate <10%	0.034***	0.043***	0.033	0.063***	0.102**	0.118***	0.083***	0.026***
	6.38	*3.20*	*1.44*	*8.74*	*2.36*	*3.69*	*5.43*	*3.82*
Assistance rate 10-<20%	0.075***	0.089***	0.069**	0.086***	0.228***	0.213***	0.097***	0.068***
	10.88	*4.17*	*2.06*	*12.30*	*5.89*	*7.24*	*6.23*	*8.56*
Assistance rate 20-<50%	0.081***	0.084***	0.043	0.089***	0.139***	0.109***	0.091***	0.075***
	6.53	*3.17*	*1.01*	*8.44*	*2.99*	*2.70*	*3.52*	*6.84*
Assistance rate 50+%	-0.048***	-0.022	-0.067*	-0.039*	-0.093**	-0.113	-0.080**	-0.166***
	-2.91	*-0.70*	*-1.65*	*-1.80*	*-2.29*	*-1.44*	*-2.00*	*-7.56*
Observations	188,401	46,313	26,446	40,629	35,706	2,238	17,701	39,145
Number of firms	60,649	16,494	10,157	13,991	7,724	695	3,041	11,723
AR(2) z-statistic p-value	0.252	0.130	0.109	0.134	0.437	0.178	0.122	0.118
Hansen test p-value	0.135	0.220	0.963	0.114	0.437	0.140	0.169	0.152
Results for assistance variables based on 'matched' data sample[a]								
Assistance rate <10%	0.037***	0.033***	0.046*	0.059***	0.130**	0.132***	0.104***	0.026***
	7.04	*4.27*	*1.87*	*7.73*	*2.41*	*3.82*	*3.19*	*3.67*
Assistance rate 10-<20%	0.071***	0.079***	0.083**	0.080***	0.230***	0.229***	0.124**	0.054***
	10.37	*5.42*	*2.29*	*11.37*	*4.05*	*7.56*	*2.14*	*6.40*
Assistance rate 20-<50%	0.075***	0.081***	0.062	0.079***	0.132**	0.134***	0.109	0.071***
	5.74	*4.36*	*1.33*	*7.25*	*2.13*	*3.51*	*1.54*	*5.97*
Assistance rate 50+%	-0.045***	-0.029	-0.038	-0.038*	-0.126**	-0.072	-0.106	-0.140***
	-2.75	*-1.24*	*-1.04*	*-1.75*	*-2.40*	*-1.08*	*-1.34*	*-5.86*
Observations	147,579	26,377	22,225	33,075	24,057	1,438	10,203	19,182
Number of firms	54,978	11,149	9,168	12,460	7,045	506	2,796	7,654
Rubins' B	8.0	12.8	15.7	13.0	7.8	24.6	9.3	14.0
Rubins' R	0.91	0.97	0.96	0.97	1.02	1.12	0.97	0.92

Table U.1: Long-run two-step system-GMM production function (26 industries, China, 1998-2007)

Dependent variable: *ln* sales	Other Mining (SIC10+80)	Food production (SIC14)	Tobacco (SIC16)	Textile (SIC17)	Apparel &footwear (SIC18)	Leather (SIC19)
ln intermediate inputs	0.579***	0.370***	0.367***	0.623***	0.592***	0.690***
	7.39	*2.56*	*4.28*	*10.15*	*6.50*	*12.12*
ln employment	0.271***	0.446***	0.743**	0.315***	0.246**	0.181***
	4.70	*3.45*	*2.51*	*5.37*	*2.80*	*3.79*
ln capital	0.193**	0.273*	0.366**	0.107***	0.205**	0.143*
	2.46	*1.68*	*2.31*	*4.49*	*1.96*	*1.93*
Time trend	0.034***	0.028***	0.046**	0.001	0.054***	0.016***
	12.03	*3.11*	*2.21*	*0.20*	*10.03*	*4.66*
Assistance rate <10%	0.027***	0.064***	0.022	0.024***	0.034***	0.019***
	4.40	*7.48*	*0.57*	*5.57*	*3.86*	*4.60*
Assistance rate 10-<20%	0.069***	0.091***	0.013	0.083***	0.081***	0.035***
	11.07	*7.93*	*0.25*	*7.73*	*4.10*	*4.39*
Assistance rate 20-<50%	0.080***	0.087***	0.067	0.101***	0.079***	0.035***
	7.24	*4.67*	*0.84*	*6.19*	*2.96*	*2.57*
Assistance rate 50+%	-0.011	0.028	-0.109	0.001	-0.062*	-0.013
	-0.45	*0.88*	*-1.00*	*0.06*	*-1.84*	*-0.81*
ln firm age	0.009	-0.013	-0.045	-0.055***	-0.069***	-0.026*
	1.08	*-1.41*	*-0.60*	*-3.56*	*-3.00*	*-1.75*
No political affiliation	0.022***	0.030**	0.187**	0.033***	0.014**	-0.008*
	3.01	*2.50*	*1.99*	*5.26*	*1.94*	*-1.86*
High political affiliation	-0.070**	0.061**	-0.136	-0.029*	0.031	-0.030
	-2.33	*2.34*	*-0.80*	*-1.79*	*0.70*	*-1.07*
Foreign-owned	-0.040	-0.057	0.090	-0.043***	-0.059*	-0.027**
	-0.83	*-0.72*	*0.44*	*-2.66*	*-1.91*	*-2.20*
SOE	-0.098***	-0.146***	0.003	-0.154***	-0.116***	-0.061***
	-2.66	*-3.51*	*0.05*	*-5.51*	*-2.74*	*-2.85*
HK/Macau/Taiwan-owned	0.005	-0.050	0.424**	-0.077***	-0.065***	-0.038**
	0.12	*-0.79*	*1.98*	*-3.97*	*-2.56*	*-2.51*
Collective-owned	0.024*	0.005	0.088	0.011**	-0.001	0.007
	1.85	*0.41*	*0.90*	*2.21*	*-0.11*	*1.19*
Exporter	-0.009	0.043	0.254	-0.003	-0.000	-0.000
	-0.06	*0.21*	*1.58*	*-0.23*	*-0.00*	*-0.06*
R&D dummy	0.016	-0.459	-0.329*	0.029***	-0.097	0.114
	0.15	*-1.20*	*-1.88*	*3.50*	*-1.38*	*0.79*
ln Agglomeration	0.025	0.046	-0.025	0.023	0.030	-0.004
	3.44	*3.73*	*-0.64*	*3.96*	*2.49*	*-1.49*
ln Diversification	0.062***	0.072***	0.008	0.159***	0.191***	0.097***
	4.14	*3.54*	*0.13*	*11.19*	*8.16*	*4.31*
ln Herfindahl	-0.062***	-0.213***	0.083	0.245***	0.165***	0.002
	-3.61	*-3.72*	*0.92*	*11.71*	*4.60*	*0.12*
ln Fixed costs	-0.017***	-0.048**	-0.049*	-0.026***	-0.009	-0.020***
	-4.72	*-2.37*	*-1.87*	*-3.15*	*-0.67*	*-2.73*
Neg_liquid	-0.019***	-0.052***	-0.047	-0.037***	-0.060***	-0.024**
	-2.95	*-4.12*	*-0.89*	*-5.72*	*-3.53*	*-2.44*
ln liquidity	0.327***	0.355**	1.161***	0.307***	0.335***	0.139**

	3.44	*2.24*	*4.84*	*6.35*	*2.69*	*2.23*
City 200	-0.017**	-0.021	-0.114**	-0.062***	-0.063***	-0.037***
	-2.30	*-1.39*	*-2.27*	*-5.59*	*-3.75*	*-6.50*
Western China	0.019	-0.009	0.270*	0.043***	-0.024	-0.039***
	1.42	*-0.31*	*1.80*	*3.48*	*-0.90*	*-2.97*
East Coast	-0.058***	-0.047	0.156	-0.034**	-0.081*	-0.017
	-4.03	*-1.23*	*1.60*	*-2.24*	*-1.91*	*-0.74*
Central China	-0.023	0.018	0.069	0.012	-0.081**	-0.020
	-1.57	*0.70*	*0.82*	*1.01*	*-1.98*	*-1.27*
Proportion new firms	-0.221**	-0.265	-0.480	-0.477***	-0.261***	0.030
	-2.34	*-1.01*	*-1.42*	*-4.81*	*-2.59*	*0.65*
Tariff rate (fob final goods)	-0.016***	-0.008***	0.000	-0.002*	0.002	-0.004
	-4.92	*-2.59*	*0.11*	*-1.70*	*0.38*	*-1.17*
Observations	22,089	23,186	2,244	112,526	65,023	24,872
Number of firms	9,426	8,850	483	35,007	20,534	9,209
AR(2) z-statistic	0.344	-1.423	0.273	-1.052	0.099	-1.219
AR(2) z-statistic p-value	0.731	0.155	0.785	0.293	0.921	0.223
Hansen test	10.070	9.934	9.911	5.124	7.840	7.327
Hansen test p-value	0.122	0.127	0.538	0.163	0.250	0.396
Returns-To-Scale	0.043	0.089	0.475**	0.046***	0.043*	0.014
	1.14	*1.18*	*2.47*	*3.14*	*1.65*	*0.61*
Results for assistance variables based on 'matched' data sample[a]						
Assistance rate <10%	0.031***	0.053***	0.048	0.019***	0.040***	0.023***
	4.55	*6.94*	*1.18*	*5.05*	*3.56*	*5.22*
Assistance rate 10-<20%	0.072***	0.078***	-0.015	0.076***	0.088***	0.045***
	10.06	*7.62*	*-0.23*	*7.49*	*3.68*	*5.96*
Assistance rate 20-<50%	0.083***	0.077***	-0.011	0.094***	0.082**	0.049***
	6.60	*4.41*	*-0.14*	*6.15*	*2.42*	*3.21*
Assistance rate 50+%	-0.005	0.006	-0.167	-0.006	-0.060	-0.020
	-0.21	*0.18*	*-1.55*	*-0.35*	*-1.60*	*-1.15*
Observations	12,110	14,063	1,227	93,680	55,242	14,942
Number of firms	6,014	6,154	389	32,324	18,939	6,333
Rubins' B	20.9	18.9	20.1	10.9	12.6	15.5
Rubins' R	1.08	0.92	1.06	0.93	0.96	1.03

z-statistics in italics and parenthesis. ***/**/* significant at 1/5/10% level.
[a] 'matched' sample comprising treatment and control group obtained using propensity score matching for each industry. Rubin (2001) recommends that B be less than 25 and that R be between 0.5 and 2 for the samples to be considered sufficiently balanced.

Table U.1. Cont

Dependent variable: *ln* sales	Timber (SIC20)	Furniture (SIC21)	Paper-making (SIC22)	Printing (SIC23)	Cultural (SIC24)	Petroleum Processing (SIC25+70)
ln intermediate inputs	0.404***	0.789***	0.607***	0.554***	0.764***	0.564***
	3.21	*9.88*	*12.65*	*7.58*	*14.86*	*3.95*
ln employment	0.543***	0.180**	0.313***	0.352**	0.220***	0.372***
	4.44	*2.18*	*7.06*	*2.54*	*3.32*	*2.64*
ln capital	0.170**	0.106***	0.098***	0.186***	0.063*	0.146**
	1.99	*2.73*	*3.06*	*3.87*	*1.89*	*1.99*
Time trend	0.051***	0.019***	0.030***	0.052***	0.082***	-0.018*
	5.64	*3.13*	*10.45*	*5.74*	*15.06*	*-1.68*
Assistance rate <10%	0.057***	0.042***	0.035***	0.069***	0.055***	0.016
	5.99	*5.53*	*10.54*	*10.43*	*7.68*	*1.09*
Assistance rate 10-<20%	0.094***	0.080***	0.066***	0.109***	0.110***	0.088***
	8.75	*9.87*	*16.23*	*14.02*	*10.36*	*3.73*
Assistance rate 20-<50%	0.113***	0.092***	0.060***	0.114***	0.131***	0.069**
	5.54	*8.59*	*9.52*	*7.14*	*10.84*	*2.05*
Assistance rate 50+%	-0.017	0.002	-0.043***	-0.019	-0.054**	-0.032
	-0.47	*0.09*	*-2.98*	*-0.84*	*-1.96*	*-0.72*
ln firm age	-0.028**	-0.021*	-0.016**	-0.122***	-0.005	-0.059
	-2.29	*-1.77*	*-2.51*	*-3.29*	*-0.38*	*-1.56*
No political affiliation	0.023	0.005	-0.006	0.031***	0.006	0.041**
	1.54	*0.67*	*-1.51*	*3.83*	*0.66*	*2.15*
High political affiliation	-0.207***	0.005	0.035**	0.037**	0.018	0.024
	-2.37	*0.14*	*2.13*	*2.13*	*0.48*	*0.36*
Foreign-owned	-0.065*	0.021	-0.072*	-0.112***	0.026	0.099
	-1.80	*0.40*	*-1.84*	*-2.61*	*0.83*	*1.12*
SOE	-0.320***	-0.127**	-0.027**	-0.143***	-0.113*	-0.048
	-3.27	*-2.06*	*-2.15*	*-4.56*	*-1.82*	*-1.21*
HK/Macau/Taiwan-owned	-0.134***	-0.013	-0.096**	-0.163***	-0.016	0.024
	-3.70	*-0.22*	*-2.17*	*-3.73*	*-0.44*	*0.37*
Collective-owned	0.070***	0.007	0.003	0.046***	-0.033*	-0.002
	2.99	*0.53*	*0.55*	*4.25*	*-1.75*	*-0.09*
Exporter	-0.119**	0.230	-0.291**	-0.147	0.334*	-0.837**
	-2.01	*1.51*	*-2.20*	*-1.12*	*1.92*	*-2.33*
R&D dummy	0.443	-0.013	0.008	0.064***	0.024	0.024
	1.16	*-0.86*	*0.61*	*3.49*	*1.51*	*0.67*
ln Agglomeration	0.078***	0.030***	0.021***	0.033***	-0.026**	0.030
	4.23	*3.25*	*3.16*	*2.87*	*-2.37*	*1.59*
ln Diversification	0.272***	0.133***	0.116***	0.199***	0.146***	0.104*
	5.85	*3.23*	*8.82*	*14.31*	*4.45*	*1.67*
ln Herfindahl	0.049*	0.016	-0.063***	0.057***	0.491***	-0.190***
	1.73	*0.33*	*-7.08*	*3.04*	*7.05*	*-3.14*
ln Fixed costs	-0.071***	-0.020**	-0.017***	-0.034***	-0.005	-0.039**
	-4.86	*-2.22*	*-4.89*	*-5.00*	*-0.81*	*-2.38*
Neg_liquid	-0.051***	-0.027***	-0.023***	-0.057***	-0.025***	-0.056***
	-3.49	*-2.59*	*-4.94*	*-6.70*	*-2.60*	*-2.85*
ln liquidity	0.412***	0.188***	0.146***	0.472***	0.167***	0.425**
	2.73	*2.68*	*4.66*	*5.61*	*2.92*	*2.24*

City 200	0.022	-0.074***	-0.038***	-0.109***	0.011	-0.012
	0.86	*-6.30*	*-6.42*	*-7.20*	*0.76*	*-0.54*
Western China	0.001	-0.025	-0.040***	0.034	0.200***	0.304***
	0.02	*-0.74*	*-4.80*	*1.44*	*3.88*	*2.97*
East Coast	-0.055**	-0.025	-0.053***	0.062**	0.034	0.229***
	-2.02	*-0.53*	*-4.03*	*2.10*	*0.77*	*2.69*
Central China	0.022	-0.022	-0.020**	0.046**	-0.191***	0.217***
	0.87	*-0.79*	*-2.15*	*2.50*	*-2.60*	*2.77*
Proportion new firms	-0.286***	-0.011	-0.066	0.386*	0.412***	0.148
	-3.93	*-0.12*	*-0.34*	*1.84*	*2.86*	*0.88*
Tariff rate (fob final goods)	-0.013***	-0.002*	-0.003***	-0.003	-0.003	0.007
	-4.19	*-1.69*	*-3.26*	*-1.56*	*-1.56*	*0.38*
Observations	38,762	22,091	30,420	36,663	24,426	8,544
Number of firms	12,942	6,960	10,230	10,168	6,962	3,061
AR(2) z-statistic	-1.511	-1.063	0.339	-0.411	-1.104	-1.350
AR(2) z-statistic p-value	0.131	0.288	0.735	0.681	0.270	0.177
Hansen test	5.826	11.850	6.966	11.780	13.080	3.348
Hansen test p-value	0.667	0.158	0.223	0.226	0.159	0.646
Returns-To-Scale	0.116*	0.075**	0.017	0.093	0.046	0.082
	1.78	*2.03*	*0.58*	*1.40*	*1.44*	*1.38*
Results for assistance variables based on 'matched' data sample						
Assistance rate <10%	0.060***	0.037***	0.035***	0.056***	0.052***	0.014
	6.57	*4.61*	*9.50*	*10.16*	*6.43*	*0.86*
Assistance rate 10-<20%	0.095***	0.071***	0.065***	0.098***	0.100***	0.088***
	9.71	*8.30*	*15.58*	*15.40*	*9.57*	*3.35*
Assistance rate 20-<50%	0.127***	0.081***	0.059***	0.080***	0.122***	0.072**
	6.44	*7.34*	*8.39*	*5.71*	*10.06*	*1.96*
Assistance rate 50+%	0.021	-0.006	-0.048***	-0.047**	-0.057*	-0.038
	0.66	*-0.25*	*-3.28*	*-2.40*	*-1.93*	*-0.74*
Observations	23,605	13,361	18,110	18,443	15,290	6,657
Number of firms	8,909	4,890	7,370	6,795	4,994	2,728
Rubins' B	14.5	18.7	15.7	12.4	18.8	16.5
Rubins' R	1.02	1.05	1.12	0.88	1.04	0.99

Table U.1. Cont

Dependent variable: *ln* sales	Chemical (SIC26+28)	Medical (SIC27)	Rubber (SIC29)	Plastic (SIC30)	Nonmetal products (SIC31)	Metal products (SIC32+33+34)
ln intermediate inputs	0.516***	0.468***	0.591***	0.838***	0.257***	0.433***
	22.06	*8.34*	*5.32*	*21.65*	*3.24*	*5.21*
ln employment	0.593***	0.517***	0.237*	0.141***	0.812***	0.748***
	18.09	*3.72*	*1.77*	*2.58*	*6.41*	*3.24*
ln capital	0.071***	0.166***	0.131*	0.061***	0.234**	0.249***
	3.83	*4.16*	*1.81*	*3.10*	*2.23*	*2.80*
Time trend	0.028***	0.037***	0.046***	0.028***	0.144***	0.101***
	18.13	*5.59*	*3.46*	*5.21*	*12.39*	*6.43*
Assistance rate <10%	0.031***	0.043***	0.063***	0.018***	0.047***	-0.016
	9.65	*5.47*	*5.10*	*3.09*	*3.43*	*-1.31*
Assistance rate 10-<20%	0.075***	0.101***	0.103***	0.054***	0.086***	0.083***
	23.69	*12.34*	*9.12*	*4.01*	*6.27*	*3.30*
Assistance rate 20-<50%	0.073***	0.116***	0.113***	0.055***	0.104***	0.082**
	16.04	*8.59*	*5.36*	*4.65*	*3.92*	*2.34*
Assistance rate 50+%	-0.006	0.001	0.021	-0.028	0.055*	0.128***
	-0.61	*0.03*	*0.64*	*-1.32*	*1.89*	*2.75*
ln firm age	-0.043***	-0.069**	-0.042*	-0.018	-0.198***	-0.220***
	-9.43	*-2.49*	*-1.66*	*-1.57*	*-5.68*	*-3.43*
No political affiliation	0.030***	0.043***	0.020**	-0.001	0.036***	0.033***
	7.17	*3.13*	*1.97*	*-0.32*	*2.91*	*3.13*
High political affiliation	-0.015	0.001	0.032	-0.004	-0.017	-0.363***
	-1.08	*0.07*	*0.62*	*-0.26*	*-0.34*	*-3.56*
Foreign-owned	0.023	0.008	-0.024	0.001	0.051	-0.209***
	1.41	*0.24*	*-0.31*	*0.04*	*0.51*	*-3.11*
SOE	-0.089***	-0.102***	-0.176***	-0.071***	-0.292***	-0.313***
	-9.55	*-4.99*	*-2.87*	*-2.99*	*-8.27*	*-5.17*
HK/Macau/Taiwan-owned	0.002	0.013	-0.059	-0.032**	-0.099	-0.349***
	0.15	*0.61*	*-0.74*	*-2.12*	*-1.52*	*-5.18*
Collective-owned	-0.001	0.008	0.031**	0.006	-0.012	0.027*
	-0.27	*0.75*	*2.09*	*1.00*	*-0.67*	*1.83*
Exporter	-0.071*	-0.088	-0.056	0.037**	0.200	0.066
	-1.66	*-0.76*	*-0.36*	*2.06*	*1.34*	*0.47*
R&D dummy	-0.014	0.200*	0.242	0.159**	-0.116*	-0.013
	-0.19	*1.74*	*1.39*	*2.23*	*-1.64*	*-0.70*
ln Agglomeration	0.031***	0.018	0.043***	-0.005	0.097***	0.039***
	8.69	*1.47*	*3.14*	*-1.26*	*8.10*	*3.49*
ln Diversification	0.114***	0.131***	0.201***	0.148***	0.194***	0.348***
	12.50	*7.40*	*5.84*	*6.74*	*4.91*	*6.97*
ln Herfindahl	-0.059***	-0.167***	-0.257***	-0.040	-0.156***	0.087***
	-10.17	*-4.23*	*-4.03*	*-1.15*	*-4.06*	*3.11*
ln Fixed costs	-0.047***	-0.083***	-0.035***	-0.016***	-0.020*	-0.113***
	-12.41	*-4.75*	*-3.02*	*-2.97*	*-1.87*	*-4.53*
Neg_liquid	-0.040***	-0.039***	-0.044**	-0.019***	-0.094***	-0.077***
	-9.85	*-4.31*	*-2.48*	*-3.54*	*-7.62*	*-4.85*
ln liquidity	0.208***	0.433***	0.287***	0.249***	0.382	0.797***
	11.02	*6.81*	*3.15*	*7.66*	*1.32*	*5.39*

City 200	-0.043***	-0.069***	-0.114***	-0.093***	0.021	-0.090***
	-7.73	*-5.67*	*-6.70*	*-4.75*	*0.83*	*-6.70*
Western China	0.028***	0.060*	-0.045*	-0.024	0.090***	0.110***
	3.00	*1.82*	*-1.82*	*-1.51*	*3.09*	*2.89*
East Coast	-0.031***	-0.054**	-0.065*	-0.023	0.090**	0.016
	-2.60	*-2.25*	*-1.68*	*-1.50*	*2.34*	*0.53*
Central China	-0.012	0.009	-0.066**	-0.067***	-0.154***	0.056***
	-1.22	*0.45*	*-2.02*	*-5.19*	*-5.46*	*2.80*
Proportion new firms	-0.635***	-0.303*	0.066	-0.333***	-1.884***	–
	-7.41	*-1.68*	*0.63*	*-3.59*	*-6.26*	
Tariff rate (fob final goods)	0.001*	0.004	-0.004	0.005***	0.066***	-0.001
	1.69	*1.18*	*-1.03*	*3.57*	*4.90*	*-0.20*
Observations	73,792	23,574	22,894	54,610	118,081	91,234
Number of firms	26,817	7,328	6,611	18,174	35,083	32,525
AR(2) z-statistic	-0.703	-0.399	-1.051	-1.464	1.229	1.502
AR(2) z-statistic p-value	0.482	0.690	0.293	0.143	0.219	0.133
Hansen test	13.020	9.076	12.840	5.842	7.721	6.858
Hansen test p-value	0.111	0.247	0.233	0.441	0.102	0.334
Returns-To-Scale	0.180***	0.152	-0.040	0.039	0.303***	0.429***
	7.84	*1.41*	*-0.74*	*1.57*	*5.23*	*3.03*
Results for assistance variables based on 'matched' data sample						
Assistance rate <10%	0.026***	0.042***	0.048***	0.013**	0.044**	-0.017
	8.54	*5.56*	*4.88*	*2.25*	*2.33*	*-1.18*
Assistance rate 10-<20%	0.068***	0.092***	0.082***	0.041***	0.084***	0.105**
	21.28	*11.33*	*7.18*	*3.17*	*3.99*	*2.54*
Assistance rate 20-<50%	0.067***	0.104***	0.083***	0.044***	0.102***	0.117**
	15.20	*7.96*	*4.38*	*3.76*	*2.58*	*2.04*
Assistance rate 50+%	-0.023**	-0.009	-0.009	-0.016	0.041	0.171**
	-2.22	*-0.37*	*-0.30*	*-0.95*	*1.09*	*2.25*
Observations	46,149	15,390	13,856	44,588	94,455	73,534
Number of firms	19,266	5,646	4,820	16,427	32,112	29,099
Rubins' B	11.0	12.4	16.3	12.2	9.7	10.9
Rubins' R	0.93	0.93	0.93	0.97	0.92	0.95

Table U.1. Cont

Dependent variable: *ln* sales	Machinery & Equipment (SIC35+36)	Transport equipment (SIC37)	Measuring instrument (SIC41)	Other manufacturing (SIC42+43)	Electronic power (SIC44)
ln intermediate inputs	0.751***	0.560***	0.745***	0.807***	0.322***
	14.64	*4.22*	*9.15*	*19.95*	*6.55*
ln employment	0.269***	0.348**	0.249**	0.091*	0.598***
	4.08	*2.07*	*2.26*	*1.79*	*2.64*
ln capital	0.119***	0.128**	0.140*	0.056**	0.345**
	3.05	*2.45*	*1.70*	*1.98*	*2.07*
Time trend	0.057***	0.065***	0.075***	0.013***	0.087***
	9.50	*4.12*	*10.95*	*3.10*	*5.59*
Assistance rate <10%	0.034***	0.043***	0.033	0.063***	0.102**
	6.38	*3.20*	*1.44*	*8.74*	*2.36*
Assistance rate 10-<20%	0.075***	0.089***	0.069**	0.086***	0.228***
	10.88	*4.17*	*2.06*	*12.30*	*5.89*
Assistance rate 20-<50%	0.081***	0.084***	0.043	0.089***	0.139***
	6.53	*3.17*	*1.01*	*8.44*	*2.99*
Assistance rate 50+%	-0.048***	-0.022	-0.067*	-0.039*	-0.093**
	-2.91	*-0.70*	*-1.65*	*-1.80*	*-2.29*
ln firm age	-0.110***	-0.034***	-0.134***	-0.044***	0.011
	-8.19	*-2.63*	*-2.88*	*-2.72*	*0.13*
No political affiliation	0.025***	0.006	0.013	-0.031***	0.174***
	6.65	*0.75*	*1.03*	*-4.02*	*3.34*
High political affiliation	0.019	-0.052	0.016	0.097***	0.124
	1.03	*-0.71*	*0.49*	*3.19*	*0.89*
Foreign-owned	-0.015	-0.010	-0.026	-0.056**	0.027
	-0.54	*-0.23*	*-0.44*	*-1.97*	*0.30*
SOE	-0.177***	-0.065**	-0.118***	-0.084*	-0.093*
	-5.12	*-2.05*	*-2.98*	*-1.88*	*-1.67*
HK/Macau/Taiwan-owned	-0.096***	-0.031	-0.072**	-0.108***	0.077
	-4.85	*-0.89*	*-2.15*	*-3.79*	*1.03*
Collective-owned	0.020**	0.007	0.063**	-0.005	0.100
	2.20	*0.78*	*2.18*	*-0.44*	*0.98*
Exporter	-0.014	-0.004	0.165***	-0.276	-2.132***
	-0.34	*-0.05*	*4.18*	*-1.60*	*-2.99*
R&D dummy	-0.141**	0.004	0.241	-0.054	0.086
	-2.39	*0.03*	*1.17*	*-1.22*	*1.31*
ln Agglomeration	0.017***	-0.178	-0.003	-0.038***	0.067**
	4.27	*-0.86*	*-0.49*	*-3.12*	*2.52*
ln Diversification	0.266***	0.276*	0.206***	0.254***	0.109***
	22.70	*1.64*	*5.51*	*9.96*	*3.80*
ln Herfindahl	-0.071***	-0.049	0.085***	0.055***	-0.300***
	-4.46	*-1.54*	*3.73*	*3.73*	*-3.60*
ln Fixed costs	-0.051***	-0.029***	-0.016	-0.014**	-0.013
	-8.32	*-2.71*	*-0.56*	*-2.13*	*-0.76*
Neg_liquid	-0.047***	-0.028***	-0.053***	-0.050***	-0.030
	-7.31	*-4.26*	*-3.20*	*-5.26*	*-0.75*
ln liquidity	0.360***	0.185***	0.526***	0.177***	1.024**
	6.36	*4.48*	*3.25*	*3.49*	*2.07*

City 200	-0.182***	-0.075***	-0.092***	-0.099***	0.002
	-14.96	*-5.03*	*-4.30*	*-9.86*	*0.05*
Western China	-0.026*	0.099	0.108***	-0.004	0.352***
	-1.89	*0.72*	*2.67*	*-0.15*	*2.86*
East Coast	0.004	0.031	0.057	0.006	0.233***
	0.31	*0.40*	*1.49*	*0.26*	*6.14*
Central China	-0.002	-0.066	0.006	-0.102***	0.224***
	-0.21	*-1.59*	*0.17*	*-4.13*	*2.99*
Proportion new firms	0.034	-0.633**	-0.707***	–	-0.594
	0.17	*-2.28*	*-2.86*		*-1.56*
Tariff rate (fob final goods)	-0.006***	0.000	0.014***	-0.002	0.108***
	-3.69	*-0.18*	*4.96*	*-0.82*	*7.93*
Observations	188,401	46,313	26,446	40,629	35,706
Number of firms	60,649	16,494	10,157	13,991	7,724
AR(2) z-statistic	-1.146	-1.512	-1.605	-1.497	-0.778
AR(2) z-statistic p-value	0.252	0.130	0.109	0.134	0.437
Hansen test	16.180	11.890	1.935	11.600	3.780
Hansen test p-value	0.135	0.220	0.963	0.114	0.437
Returns-To-Scale	0.140***	0.035	0.134***	-0.045	0.266*
	6.21	*0.85*	*2.88*	*-1.23*	*1.82*
Results for assistance variables based on 'matched' data sample					
Assistance rate <10%	0.037***	0.033***	0.046*	0.059***	0.130**
	7.04	*4.27*	*1.87*	*7.73*	*2.41*
Assistance rate 10-<20%	0.071***	0.079***	0.083**	0.080***	0.230***
	10.37	*5.42*	*2.29*	*11.37*	*4.05*
Assistance rate 20-<50%	0.075***	0.081***	0.062	0.079***	0.132**
	5.74	*4.36*	*1.33*	*7.25*	*2.13*
Assistance rate 50+%	-0.045***	-0.029	-0.038	-0.038*	-0.126**
	-2.75	*-1.24*	*-1.04*	*-1.75*	*-2.40*
Observations	147,579	26,377	22,225	33,075	24,057
Number of firms	54,978	11,149	9,168	12,460	7,045
Rubins' B	8.0	12.8	15.7	13.0	7.8
Rubins' R	0.91	0.97	0.96	0.97	1.02

Table U.1. Cont

Dependent variable: *ln* sales	Gas production (SIC45)	Water production (SIC46)	Coal Mining (SIC60)
ln intermediate inputs	0.257***	0.262***	0.688***
	2.82	*5.28*	*16.05*
ln employment	0.287***	0.363*	0.229***
	2.71	*1.86*	*4.77*
ln capital	0.485***	0.337***	0.099***
	3.95	*3.85*	*2.75*
Time trend	0.075***	0.039***	0.007
	6.47	*5.70*	*1.30*
Assistance rate <10%	0.118***	0.083***	0.026***
	3.69	*5.43*	*3.82*
Assistance rate 10-<20%	0.213***	0.097***	0.068***
	7.24	*6.23*	*8.56*
Assistance rate 20-<50%	0.109***	0.091***	0.075***
	2.70	*3.52*	*6.84*
Assistance rate 50+%	-0.113	-0.080**	-0.166***
	-1.44	*-2.00*	*-7.56*
ln firm age	-0.026	0.007	-0.053***
	-0.46	*0.11*	*-3.63*
No political affiliation	0.169***	0.120***	0.034***
	2.60	*2.93*	*3.62*
High political affiliation	0.340***	0.170***	-0.053
	2.88	*2.62*	*-0.82*
Foreign-owned	-0.099	0.205**	-0.325**
	-1.28	*2.06*	*-2.21*
SOE	-0.286***	-0.200***	-0.137***
	-3.71	*-5.18*	*-5.59*
HK/Macau/Taiwan-owned	-0.122	0.108	0.057
	-1.57	*1.11*	*0.63*
Collective-owned	0.151*	0.192***	-0.024***
	1.85	*3.30*	*-2.70*
Exporter	-0.234	0.616	-0.063**
	-0.51	*1.30*	*-2.28*
R&D dummy	-0.060	0.133	0.301***
	-0.73	*0.74*	*4.33*
ln Agglomeration	0.121***	0.103***	0.061***
	3.11	*5.06*	*8.64*
ln Diversification	0.144**	0.120***	0.045***
	2.26	*4.14*	*3.08*
ln Herfindahl	0.213**	0.060***	-0.509***
	2.43	*3.59*	*-14.58*
ln Fixed costs	-0.097***	-0.012	0.003
	-4.21	*-1.07*	*0.87*
Neg_liquid	-0.028	-0.042**	-0.035***
	-0.81	*-2.52*	*-5.32*
ln liquidity	0.859***	0.416***	0.363***
	3.11	*2.97*	*5.31*
City 200	-0.004	0.050*	-0.082***

	-0.07	*1.81*	*-8.44*
Western China	0.008	0.128*	0.142***
	0.09	*1.78*	*6.26*
East Coast	-0.273***	-0.100**	-0.026
	-2.60	*-2.27*	*-1.12*
Central China	0.092	0.151*	0.092***
	1.01	*1.70*	*8.23*
Proportion new firms	-0.114	-0.211	-0.164**
	-0.62	*-0.52*	*-1.99*
Tariff rate (fob final goods)	–	–	0.081***
			8.29
Observations	2,238	17,701	39,145
Number of firms	695	3,041	11,723
AR(2) z-statistic	-1.346	1.546	-1.561
AR(2) z-statistic p-value	0.178	0.122	0.118
Hansen test	26.840	12.860	8.073
Hansen test p-value	0.140	0.169	0.152
Returns-To-Scale	0.030	-0.038	0.016
	0.24	*-0.30*	*0.47*
Results for assistance variables based on 'matched' data sample			
Assistance rate <10%	0.132***	0.104***	0.026***
	3.82	*3.19*	*3.67*
Assistance rate 10-<20%	0.229***	0.124**	0.054***
	7.56	*2.14*	*6.40*
Assistance rate 20-<50%	0.134***	0.109	0.071***
	3.51	*1.54*	*5.97*
Assistance rate 50+%	-0.072	-0.106	-0.140***
	-1.08	*-1.34*	*-5.86*
Observations	1,438	10,203	19,182
Number of firms	506	2,796	7,654
Rubins' B	24.6	9.3	14.0
Rubins' R	1.12	0.97	0.92

Table U.2: Average final goods tariffs by industry in China, 1998-2007

industry	ISIC rev 3	NBS code	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Coal mining	10	60	4.21	4.21	4.21	4.07	4.07	4.07	4.07	4.07	3.64	4.07
Petroleum & Natural Gas extraction	11	70	4.91	6.00	6.00	6.00	3.00	3.00	1.50	1.50	1.50	1.50
Ferrous mining	131	80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
non-ferrous mining	132	90	0.11	0.11	0.11	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Other mining	14	10	4.02	3.97	3.97	3.40	3.31	3.30	3.29	3.28	3.02	3.32
Timber logging	2	12	11.55	10.97	11.44	10.51	9.85	9.33	9.05	9.25	9.05	8.49
Processing agricultural products	151-153	13	29.26	28.99	29.25	27.84	20.66	18.77	17.36	15.53	16.17	16.13
Foodstuff	154	14	26.82	26.82	30.69	29.40	24.10	21.95	20.33	18.54	19.58	19.69
Beverages	155	15	55.64	55.80	55.80	50.80	37.26	30.46	25.52	21.93	21.83	21.73
Tobacco	16	16	65.00	65.00	65.00	57.00	48.00	43.67	41.00	41.00	38.17	41.00
Textiles	17	17	24.8	23.4	22.05	20.46	16.61	14.06	11.75	10.01	10.23	10.23
Spinning, weaving and textile finishing	171	1711-1719	23.26	22.23	21.30	19.88	15.53	13.05	10.91	9.02	9.39	9.38
Other textiles	172	1721-1729	27.38	25.32	23.20	21.39	18.19	15.60	13.11	11.77	11.74	11.71
knitted fabrics	173	1730-1790	29.64	27.28	24.83	22.46	18.96	16.11	13.31	11.4	11.4	11.47
Textile wearing apparel, footwear	18 + 192	18	31.83	29.46	26.75	23.95	21.69	19.74	17.84	16.69	16.7	16.57
Wearing apparel	181	1810	33.04	30.28	27.13	24.08	21.81	19.68	17.61	16.29	16.31	16.23
Fur	182	1820-1890	22.50	22.50	22.50	20.39	19.04	18.36	17.69	17.31	17.31	17.29
Leather	191	1910-1919	18.71	18.18	17.66	16.29	13.30	12.82	12.26	12.07	12.06	12.14
Footwear	192	1921-1952	25.00	25.00	25.00	24.00	21.52	20.59	19.66	19.66	19.66	19.15
Wood sawmilling & planing	201	2011-2012	4.88	2.44	4.88	4.81	1.61	1.36	1.22	1.22	1.22	1.02
Wood products	202	2021-2040	14.30	13.71	14.30	13.47	9.17	7.82	6.49	6.24	6.23	6.35
Furniture	361	21	22.00	22.00	22.00	20.52	12.59	9.41	6.36	3.31	3.25	2.93
Paper	21	22	15.99	15.84	15.95	14.82	9.79	8.05	6.69	5.80	5.75	5.62
Publishing, printing	22	23	10.82	10.82	10.82	9.71	6.64	5.52	4.84	4.15	4.15	3.87
Cultural		24	0	0	0	0	0	0	0	0	0	0
Petroleum processing	23	25	6.78	6.78	6.78	6.29	5.78	5.81	5.81	5.82	5.63	5.81
Raw chemicals	241+242 ex. 2423	26	16.51	11.19	11.18	10.23	13.01	8.07	7.79	6.87	7.28	7.35
Medicines	2423	27	9.46	9.46	9.46	8.75	5.2	4.87	4.85	4.83	4.81	4.88
Man-made fibres	243	28	17.71	16.56	16.10	15.21	10.06	7.69	5.33	5.11	5.11	5.10
Rubber	251	29	15.07	14.90	14.79	14.49	13.32	12.93	12.64	12.47	11.04	12.51
Plastics	252	30	17.37	17.34	17.35	16.29	11.67	10.42	9.19	9.10	9.00	8.97
Non-metallic mineral products	26	31	17.27	17.25	17.19	16.72	14.05	13.50	12.96	12.70	12.33	12.62
Structural metal products	281	32	15.06	15.06	15.06	14.31	11.26	10.44	9.86	9.86	9.86	9.86
Other fabricated metal products	289	33	13.53	13.49	13.48	12.68	11.42	11.27	11.20	11.18	11.15	11.12
Metal products	27	34	8.31	8.31	8.31	7.38	5.51	5.28	5.16	5.16	5.06	5.13
Ordinary machinery	291	35	14.92	14.78	14.78	14.40	10.02	9.03	8.29	8.23	8.11	8.21
Special machinery	292	36	13.43	13.33	13.28	13.02	9.52	8.90	8.64	8.62	8.53	8.54
Transport equipment	34 + 35	37	22.26	22.24	22.22	20.14	15.01	13.45	12.32	11.42	10.78	10.75
Electrical machinery and equipment	31	39	15.07	15.07	15.04	14.53	10.42	9.60	9.25	9.20	8.94	9.27
Communication equipment	32	40	18	17.98	17.99	17	11.08	10.31	9.71	9.29	9.27	13.54
Office +measuring equipment	30+33	41	14.95	14.79	14.78	13.66	9.79	8.97	8.62	8.48	8.32	8.46
Manufacturing nec	369	42+43	21.97	21.00	21.84	20.70	17.70	16.87	16.18	15.58	15.22	16.85
Electric power & heat	401	44	5.50	5.50	5.50	3.50	2.75	2.75	2.75	2.75	2.75	2.75
Gas production	402	45	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Water production	41	46	0	0	0	0	0	0	0	0	0	0

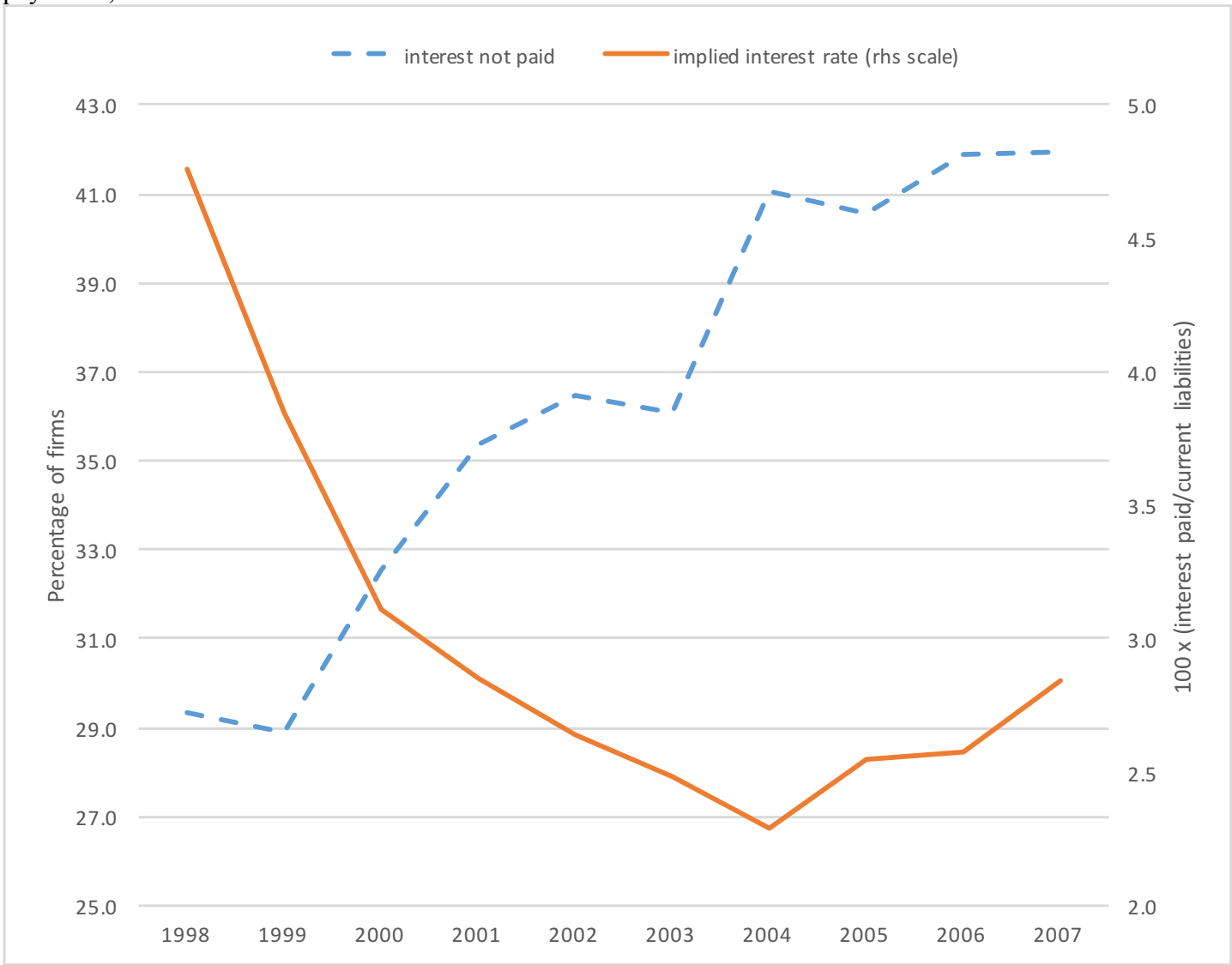
Table U.3 Value of assistance to industry as a percentage of total value-added produced, China 1998-2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
All firms[a]										
Value-added not taxed at 17% rate	6.1	6.9	5.9	6.7	6.5	6.5	7.4	7.3	7.5	7.5
Profits not taxed at 33%	2.2	1.1	4.4	3.8	3.8	4.2	4.4	4.3	4.5	4.8
Subsidised income	1.5	0.9	1.3	1.1	1.2	0.9	1.1	1.1	1.0	0.7
Total assistance	*9.8*	*8.8*	*11.6*	*11.6*	*11.5*	*11.6*	*12.9*	*12.7*	*12.9*	*13.0*
Foreign-owned[b]										
Value-added not taxed at 17% rate	8.2	7.1	7.7	7.8	9.7	9.9	10.8	11.0	11.0	10.8
Profits not taxed at 33%	4.6	2.3	7.2	7.0	6.5	6.7	6.6	5.7	5.7	6.3
Subsidised income	0.7	0.3	0.4	0.3	0.3	0.3	0.5	0.5	0.4	0.4
Total assistance	13.4	9.8	15.3	15.1	16.6	16.9	17.8	17.1	17.1	17.4
SOE's										
Value-added not taxed at 17% rate	4.7	6.9	4.1	5.8	4.4	4.1	4.3	4.3	5.3	5.3
Profits not taxed at 33%	1.4	0.6	4.4	3.6	2.2	2.7	2.9	3.4	3.9	4.3
Subsidised income	2.6	1.1	1.8	1.3	1.7	1.2	1.5	1.4	1.2	0.8
Total assistance	*8.6*	*8.6*	*10.4*	*10.7*	*8.2*	*8.0*	*8.7*	*9.2*	*10.4*	*10.4*
HK/Macao/Taiwan-owned										
Value-added not taxed at 17% rate	10.4	6.8	9.9	10.0	10.6	10.4	11.4	10.9	9.9	10.1
Profits not taxed at 33%	3.3	2.5	5.4	5.8	5.6	5.7	6.0	5.5	5.3	5.5
Subsidised income	0.4	0.3	0.3	0.3	0.4	0.2	0.4	0.5	0.5	0.5
Total assistance	*14.0*	*9.5*	*15.6*	*16.1*	*16.6*	*16.3*	*17.8*	*16.8*	*15.6*	*16.1*
Owned by collectives										
Value-added not taxed at 17% rate	7.7	6.7	7.7	7.5	7.8	7.8	7.4	7.8	7.1	7.4
Profits not taxed at 33%	2.1	1.0	2.9	2.9	3.0	3.2	4.5	3.3	3.8	4.0
Subsidised income	0.7	0.6	0.9	1.2	1.3	1.0	1.6	1.7	1.8	1.1
Total assistance	*10.4*	*8.3*	*11.5*	*11.6*	*12.1*	*12.1*	*13.5*	*12.8*	*12.7*	*12.5*
Owned by private companies										
Value-added not taxed at 17% rate	5.7	6.8	6.1	6.6	6.2	6.3	7.3	7.0	7.1	7.1
Profits not taxed at 33%	2.5	1.5	3.8	3.0	4.2	4.4	4.4	4.3	4.4	4.6
Subsidised income	0.9	0.8	1.3	1.3	1.2	0.9	1.0	1.2	1.0	0.8
Total assistance	*9.0*	*9.1*	*11.2*	*10.8*	*11.6*	*11.6*	*12.8*	*12.4*	*12.5*	*12.6*

[a] Covers manufacturing, mining and utilities. Source: NBS data

[b] Each firm was assigned to the ownership sub-group which had 50+% of its share capital. When no sub-group had 50+% then the sub-group with the largest percentage share was used.

Figure U.1: Percentage of firms making no interest payments and implied interest rate for those making interest payments, China 1998-2007



Source: NBS